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Forest College Magazine.

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THE

Madras Forest College Magazine.

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"Discuss the present Campaign against the Forest Department. Is it a true reflection of the public feeling?"

[*Third Essay for the "Indian Forester Prize for PAST Students" for 1922. By M. R. Ry. S. G. Venkataramana Ayyar, R. O. Dencanicottah.*]

IN India, Forestry is not so well advanced as in many other countries so that the real aims and benefits of Forest Conservancy are appalingly unknown not only to the masses but to a certain extent the educated people too. It is a sad irony of fate that the better class of educated men have not risen to their height of responsibility in the matter of educating the illiterate people about the beneficial effects of forestry. This state of affairs is all the more deplorable when it is remembered that India is mainly an agricultural country and as such cannot get on without forests. The Indian ryot is always shrewd and has never been slow to recognise the *direct* advantages of forests. He wants wood for house construction, for his cattle-sheds, for his furniture crude though it may be—for his working, and last but not the least for agricultural implements. He regularly purchases permits for his cattle and sheep for grazing in reserved forests and thereby realises the usefulness of forests as grazing grounds. He collects thatching grass, leaves, edible and medicinal fruits and roots from the forests and thereby has further proofs—if proofs were needed—that he cannot get on without forests. If one cares to have a free talk with the ryots, one will find how frankly the ryots admit that their very existence will be threatened if forests disappear. But what is the present hue and cry against the forest department due to? Who are leading the agitation?

It is not wrong to say that even several cultured people are under the erroneous impression that the policy of the forest department is to squeeze the maximum revenue out of the forest estates. To dispel this ignorance, the department can do no better than continue its present methods of propaganda work for teaching the ryots the advantages of forest conservancy. Nowadays one often sees forest officers at shandies and village conferences preaching most solemnly on the work and achievements of Forest Department.

The ryot finds that his long enjoyed privileges are taken away as a consequence of reservation. The semi-literate village budmash gives false hope to the ryots and assures them that disafforestation could be secured through the efforts of a B. A. B. L. whose words they wrongly presume always carry weight with the Government. The ignorant ryots easily fall a prey to this allurement and so much money per head is collected which often aggregate to good three digits. A petition is then written and sent, but much is not bound to come out of it. Only the Vakil's coffers swell. If only the villagers take the forest officers more into their confidence and resort less to petition writer, they can have all their grievances reddressed and without waste of their hardearned money. At present the only work which educated people do for the ryots in connection with their forest grievances is to contest forest cases in courts irrespective of whether the cases are true or otherwise. The lawyer profession at any rate in this Presidency is over-crowded and there is keen competition among the pleaders—often among the Junior members—to plead on behalf of the accused *for the lowest bid*. As a direct result of this unhealty competition it is not surprising to see that certain villages have drawn up muchilikas or agreements enjoining the people to contest all forest cases—true or false—in the courts and to cook up evidence suitably. The standard of morality has degenerated so far. If therefore educated people find other means of avocation than the law, the condition of the ryots will be ameliorated to some extent.

Again, the non-official members of the Legislative Councils should go more deeply into questions effecting forest management and collect first hand information from the ryots by going round the villages instead of depending on their Vakil friends for information. As instances of lack of knowledge in this respect on the part of our representatives in the council, I can quote the proposal they brought forward sometime back for the abolition of all the posts of conservators (!) and extra assistant conservators, and in another instance their refusal to sanction funds for the Russelkonda saw mill!! At present India imports timber both in the raw and in the finished state. The values of the many indigenous timber species are not yet ascertained. As pointed out in an interesting article on 'Forest utilization in Northern India' in a recent number of the 'Madras Forest College Magazine' the wood working institutes at Barielly and Chutterbuckganj have brought about in a remarkable way the uses of the at-present-little-known and little valued Indian woods. Two such instances namely Adina cordifolia (Manja kadambai-Tamil) and Anogeissus latifolia (Namai) are mentioned. My point in narrating these facts is that lot of money and time will have to be spent in research work to find out the strength, durability and other qualities of our timber species before we embark on a regular scheme of exploiting our virgin forests. This argument applies with particular force to the Evergreen forests of the Presidency. If therefore the Legislative stints to sanction funds for research works, the developement of our forests cannot be carried on. From what I have said it can be seen how necessary it is that our representatives in the councils should post themselves up with first hand information in order to faithfully fulfil their responsibilities. Some of the staunch advocates of the ryots ought to go round the forests and personally witness the damages to the forests owing to the deliberate fires started by the neighbouring villagers The damages to such valuable species as Teak and Sandal are incalculable and unless putting themselves in the position of owners of forests they realise the harm done to forest growth and soil by these devastating fires, the arm chair politicians cannot understand why the Department cannot sometimes yield to the wishes of the ryots in the matter of excessive grazing, goat browsing and so on. Large savings on the expenditure side could be shown if the people stop deliberately setting fire to the forests which means that the elaborate and costly system of fire protection measures need not be undertaken. This is by the way.

After all, Forestry is allied to agriculture in several respects and the ryot can see this easily. Both the crops require tending and manuring though in varying degrees. Both require protection against men and animals and insects and fires. When I talked on these points to the ryots they seemed to appreciate my arguments quite well. What has to be dinned into the minds of the ryots is that they do not think of harvesting their crop before it is mature and that similarly what we forest officers try to do is to cut down the forest crop after it is mature. If this point is realised by all and sundry, much of the ill will against the department will soon disappear. The Forest officer however has acquired wonderful patience by the nature of his work and environments not to take seriously the absence of a word of praise from the general public for his unselfish work and activities, 'unselfish' because in many cases the benefits of the works now carried out will be reaped only by generations yet come.

Is it not a slur to India that several people should think that the Forest Department can stop its activities without causing them any inconvenience? Does it not show lack of thought and foresight on their part? Every peasant knows that life is impossible for human kingdom without wood. Many of the discontents however seem to forget this fundamental point They also assume that Forest Officers are overzealous in the discharge of their duties and that they overlook the difficulties of the ryots Nothing can be farther from the truth. Against this argument I can quote several instances where the Department foregoes large amounts of profits in favour of the ryots. The leasing out of fuel coupes (standing growth) is an instance in point. Under the old system of departmental working the net profits to Government were several times more than what they are under the present system. Yet why should the Government resort to a system that gives it less monetary returns unles it be to benefit the people at large.

Closely allied to the campaign against the Forest Department is the attitude of the Press in India. It is unfortunate that the Press in South India has not generally taken an unprejudiced and earnest interest in Forest management and development. It has got into the habit of stirring up the emotional side of the people. In several cases the tenor of the writings indicates the idea of appealing to the imagination of the readers with little regard to the facts of the case. Little wonder then that we often hear "Much ado about nothing." This is a matter for as deep a concern to us as the apathy of the educated people in the matter of enlightening the masses about the benefits of Forest conservancy.

The mischievous activities of some of the newspapers against the Forest Department as part of their stupid campaign against the Government as a whole notwithstanding, it is a good testimony to the intelligence of the ryots that they could not be forced to actively nonco-operate with the Forest Department It is true that there were isolated instances of disturbances but on the whole the words of the platform orators were not heeded to in the villages; this shows the perspicacity of the ryots and we Forest Officers have to take note of this fact in dealing with them.

The evil lies in the inarticulate masses expressing ther grievances through the literate or semiliterate people whe have at last in some cases ther own axes to grind. The latter also very often desire to gain cheap notoriety and so either exaggerate or misrepresent facts whereas in fact with the introduction of the Forest Village scheme and the Panchayat system of managing fuel and grazing forests, the few grievances which the ryots had against the department have really disappeared Of those who carry on this campaign I ask only one question. How many of these who pose themselves as workers on behalf of the ryots have actually visited the forests? How many at least have gone to the villages and collected first hand information on the subjects about which they thunder forth in the council halls? It is far from my idea to be little the work. nay the self sacrificing work of many of these public men. But surely they have no buisness to be lacking in first hard information which is so essential to a grasp of the subject they deal with at any time.

I have so far depicted the hollowness of the movement. Even I do not want to be one sided. Before concluding therefore I cannot help recording the fact that the subordinates of the Department, the lower subordinates more especially have by their corruption and oppression of the ryots contributed somewhat to the present compaign against the

Department. Here again the ryots have not much room for grievance as the superior officers have been always ready to be free with the viliagers and to hear complaints and put down the evil tendencies of the subordinates. Also the recent re-organization scheme has done much to alleviate these difficulties and it is not expecting too much when I say that in the near future one may hear of a thoroughly honest forest subordinate staff.

On the whole the present campaign has been one sided and in some cases carried on by interested people. The ryot is as ever fully appreciative of the need of the existance and working of forests but he should be educted about the indirect benefits of Forest Conservancy and in general about the work of the Forest Department. It is up to every Forest officer to rise equal to the occasion and to allay the ryot in the dubious plight in which he is now placed.

"AN OLD STUDENT."

The commercial aspects of the soft woods of Madras, with special reference to their suitability for the manufacture of paper pulp.

[*The following essay was among those received in response to the generous offer by M.R.Ry. Rao Bahadur T. Numberumal Chetty Garu, M. L. C. of a Prize of Rs. 50 for the best Essay on the above subject. Mr. S. T. Moses, M.A., F.Z.S.,—the writer of the following Essay—won the prize*].

LONG before the 2nd century B. C. when the Chinese began making paper from cotton, etc, and the Egyptians from the pith of the Nile Bulrush this discovery was anticipated by wasps which in making their nests chewed woody fibres and barks of trees decayed or alive and kneaded the resultant into a pastey pulp between the jaws. This pulp when dried is exactly like paper.

The process of pulp making adopted by man is exactly the same as that of the wasp. The materials used are old clothes, rags, old rope, gunnybags, waste of cotton and linen industry, waste of jute mills, sugar-refuse, hemp-waste, cotton stalks, hemp straw grass, reed, wood, woodshavings, woop-chips, sawdust and even waste-paper Wood, etc., is disintegrated and ground into pulp by a grindstone which works while water is constantly flowing into the mass. This is the mechanical process. Man however has with his knowledge of chemistry discovered a cheaper and more effective method of getting rid of the noncellulose matter by the action of some alkali or acid on the raw materials. The pulp thus obtained is key-note of success and is the watch-word of every student of Foresty. We learn to command by obedience. A Forester can adopt himself to any walk of life ; Forestry is one of the most useful technical studies.

A Forester's life is of a composite nature, it is the life that any enterprising, strong and sturdy man will aspire after. His occupation demands of him a rugged physique and hardihood to bear up all privations. Honest labour and hardship are coupled with leisure. This profession stimulates all-round developments. There is a diversity in work and in place. Most of his days he is out of doors and in beautiful environments. He has office work hand in hand with camp life. He is a very responsible person and the safety of hundreds of acres is entrusted to his care. "Every Forest Officer is the Priest of a true religion." He must deal with cash properly, collect and remit revenue. He has to be very careful in village factions. He in the solitude of the wilderness, works out many sylvicultural problems ; these solutious will be useful in the future He closely sees nature to study its living forces as evinced in the growth of trees and he wields these forces to achieve his ends. He is alive to the economic demands of the people in order to shape the mangement of the forest to meet the demands. He is a public leader winning the co-operation of the people. He fares better than a lawyer and a teacher and he is a public servant of high merit. The department offers exceptional opportunities for good honest hard working men to better their status. Thus the field is immense, and very interesting in character.

This profession, on account of its varied benefits to the country is so noble that I felt it my duty to enter the College as a private student and take to forestry in earnest.

"FORESTS—THE NATION'S MINE.

lakhs. The quicker he forests are developed, the greater will be surplus revenue which can be expended on education, sanitation and other departments. Thus the Forest Department is a very useful one. Half a century ago trees were almost worth nothing but now a man with a teak grove has a fortune; thus the value of forests is increasing.

Engineers, chemists and technicists are investigating forestry problems such as the utilisation of wood. Many discoveries have been made and are being made. One of the scientific developments, is the production of ethyl or grain-alcohol from wood, which can be substituted for gasoline. Saw dust is tried to be made into fodder for cattle; artificial silk, ink, acetylene, chloroform, iodoform and celluloid are obtained from wood. Thus a new field is opened in scientific research, investigating forests. The results arrived at in the last decade, indicate that future developments will be extensive. The time may come when wood may be used in a large measure for chemical purposes.

A Forest Ranger is said to be "a Jack of all trades" His course of study makes him know every thing of something and something of every thing. The curriculum of study, comprixes of Mathematics, Physics, Chemistry, Geology, Botany, Survery, and Engineering besides courses in Forestry proper. Thus a student of Forestry is in possession of more useful knowledge of well balanced science course than the student who specialises a particular branch for a number of years. Theories given in the books are translated into practice; "A penny worth of practice is worth a pound of theory". Dignity of labour is best understood in the course. Discipline is the

the vast possibilities of our forest resources. It was Mr. Gladstone who said “ The consumption of paper is the measure of a people's culture ” The consumption of paper in the last score of years is increasing. There is an inexhausible store of bamboos in the Anamalais and their extermination is engaging the attention of the Forest Officers, in order to promote the growth of Teak crops. If we can turn them into paper, it will be a two fold advantage derived. If we can prevail over any capitalists to venture, the perennial waters of the Anamalai river, can be used for the running of a plant. If the continental countries can capture our markets with the produce of their mills transported across thousands of miles, it is really a pity if we cannot profitably make use of a river for the running of a plant, flowing a score of miles from the bamboo-area Thus we see a student of forestry is enabled to contribute his most towards making India a self-supporting country.

Many of the soft woods, unsuitable for building purposes and hence little extracted at present, can be utilised in the construction of tea boxes, cigar boxes, and packing cases. This industry holds up a fine prospect to men of enterprise. A very large quantity of soft wood is imported into India year after year for the above purpose ; this is something like sending coal to Newcastle. This is due to the lack of interest by the public. Hence it is incumbent upon a true citizen to take to forestry and put a stop to this incongruity

The importance of the Department is so great that His Excellency, the Governor, has the Forest Portfolio. It is a revenue producing department ; it bears a considerable annual revenue. The surplus revenue for the financial year 1919—20 was about 220

Agriculture, irrigation, and navigation will stand still if there is a scarcity of water; water supplies sometimes the motive power to machinery. Thus water is a potent factor in the routine of man's life and it depends upon the forests. Forests offer fine catchment areas; the forest floor is littered with humus, and unreduced vegetable debris which drink in the rain water like a sponge. This absorbed water is slowly percolated to feed the springs and rivers; thus a continuous water supply is maintained But for the forests, the rain water. finding no catchment areas, rushes down causing erosion, swells up rivers and thus endangers the interests of the villagers. Scarcity of water brings upon the failure of crops, and famine takes hold of the country. We cannot lose sight of the aesthetic and hygienic effects of forests Citizens of large cities repair to forests to recoup their lost health. The wild beasts in the forests offer fields for sport. What an important part forests play in the prosperity of a country! "In its forests lies the heart of a nation, and a people without forests is very close to extinction." Is it not then the duty of a youngman to choose forestry as his vocation?

What a vast field, Forestry as a profession, ofiers to an youngman. India possesses enough raw materials to make it self-supporting, if these products are utilised for the mannfacture of finished goods. The Forest Department has inexhaustible stores of raw products which are not exploited because the game is not worth the candle Our exploitation is confined to the extraction of a few known species which fetch good prices in the market. There is the chance for a Ranger to influence local capitalists to launch their capital on enterprises of the kind to tap

The results of recent forest research activities have manifested to us the potential value of the Forests of India and it is impossible almost to estimate the capitallized value- It is a sin if the sons of India, do not feel it a duty to study Forestry in order to realise the value

Forests afford both direct and indirect benefits, in the former case by their products and in the latter case by their influence upon climate and by the way in which they regularise rainfall, and water-supply and protect the soil The forest-produces are classified as major products forming timber and fuel and minor products the rest, comprising a great variety of articles such as tanning materials, dyes, medicines, gum, leaves, flowers, fruits, seeds, fibres, grass, bamboos, canes, lac, honey, wax, horn Thus forests represent a big capital presenting numerous opportunities for lucrative investments and an enormous amount of labour. The industrial prosperity of a nation can be gauged by its timber consumption. The increase or decrease of the quality of timber used is paralled with economic rise or fall of a nation for practically all industrial activities involve the utilization of wood. There is no limit to the use of wood. It is used for railways, aeroplanes, ships, camps and commonly for house construction, fuel, telegraph poles, pulp for paper, vinegar, alcohol, formalin, sugar, turpentine, tars, acids, drugs, drugs, scents. shoe-soles, tanning, etc. The War has opened the eyes of the world, to the demands of the various kinds of forest produce.

A treeless earth is an inferno The difference between the maximum and the minimum temperatures will be considerable. The consequence will be innundations, and typhoons; and springs will dry up nature in its vergin state, have a great regard for the vocation of forestry.

Forestry is the art of maintaining forests for the benefit of mankind. The purport of forestry is to serve humanity. It is the science and art of making the best permanent use of the forest. It increases the wealth and comfort of man. It seeks to preserve forests only in so far as these may minister to men's well being.

Ignorant rural people entertain the idea that the Forest Department stands as a stumbling block in the way of agricultural activities by withholding arable lands from being cultivated. Futher the ryots think that they are denied the rights of grazing, of collecting green manure, etc. No less than 2¼ millions of sheep and cattle are grazing in the Government forests of the Presidency. Villagers require to be allowed in the forests to hack and hew the trees and thus to ruin them

Forestry begins where agriculture stops. Land on and under the margin of cultivation, forms the field of operations of the Forester. Hence no scheme of afforestation can be looked upon with suspicion as being detrimental to agriculture. Increasing interests in industrial progress have opened the eyes of thinking men to realise that sylviculture and agriculture are inter-related eventually; conservation and improvements of those sources of motive power for which we expect from our forest clad hills and perennial streams, are instrumental to any lasting industrial development,

"Why did you choose Forestry as your profession ?"

Third Essay for the "Indian Forester Prize" for present Students for 1922.

By S Dorairaj M F. C. 1921—23 Division.

THE future of a country lies in the hands of her young men, and as such an young man should be prudent in choosing a profession. It must be beneficial to the individual in question, and also to the world at large; forestry is a calling which is after the heart of an aspiring young man.

Forestry is one of the most important Services in India It is a generation since the Forest Department was constituted. Pioneers laboured much before a true foundation has been laid. We look forward hopefully for the rapid progress in the constructive work of development and productive achievement which the pioneers have left to us for fulfilments. The Forest Department sets about the task of conserving, protecting regenerating, and improving by scientific managements, of meeting the just demands of the people from the forest, of replanting, and reclothing denuded areas, of ensuring the catchment areas of rivers and lastly of checking erosion in the mountains by raising plantations. Owing to the activities of the department, bare hills are being covered with true growths and scrub jungle is growing up into crops of value.

Young men who rebel against the confinement of indoor employments and who have a genuine love for the woods, mountains and pure cellulose. Recently a new process of making paper from rubber was discovered and is now nearly a commercial success in England.

The materials available in South India for paper making are of three kinds, grasses, barks, etc., of shrubs and softwoods. For successfully commercialising any industry many factors are essential and in this case the factors are (1) abundance of raw materials best suited for pulp making (2) cheap methods of collecting them and transporting them to the manufacturers (3) continuity of supply (4) supply of cheap fuel in unlimited quantity—1 ton of paper requires according to experts 3 tons of coal or 9 tons of wood—(5) adequate and never failing supply of water fit for pulp making—1 ton of paper requires 50,000 to 1,50,000 gallons of water which should be free from colored and other impurities (6) easy facilities for obtaining the necessary chemicals (7) cheap and efficient labour (8) efficient technical staff and lastly (9) facilities for marketing the finished products. Consideration of these factors should precede spotting the location for a factory. It should be preferably a seaport or a railway station for the easy import of raw materials and the easy disposal of the finished products and a place where the water and fuel difficulty will never arise. But the success or otherwise of the concern depends on the low cost of the raw materials, the selection of the best materials which can yield comparatively at low cost the greatest amount of good pulp, the abundance of such good materials, a guarantee of continuity of their supply and lastly the excellence of the finished product and its being marketed at a high price which would bring in decent profit.

Of grasses available in South India the China grass of Nilgiris, Jamu grass of Kolair lake, Madumalai grass of Wynaad and Ganjam grass are found to produce useful pulp. The paper made from grass is pronounced by the experts as far superior to that from bamboo pulp. Their rarity, the heavy cost of collection and their liability to decay if special precautions in storing them are not taken, preclude them from being commercially exploited. Bamboos have yielded excellent results and are now commercially utilised. So far as the continuity of supply and that at cheap rates are concerned, bamboo is easily the 1st among the raw materials available in South India. The supply can be kept perennial by a judicious cutting of the culms. Only 1 is cut of the 5 present so that the same clump need be approached only once in 5 years. Besides, while preparing pulp culms of all ages and even different species of bamboos can be treated together. Bamboo pulp is the cheapest in the world. But unfortunately in South India the only objection for an extensive use of bamboo in pulp making is the fact of its entering very largely in our life in the country parts by being extensively used for building pursoses.

Dendrocalamus strictus the most universally spread of all Indian bamboos is found in deciduous forests and dry regions of South India and Bambusa arundinacea is common all over South India. The crop is easily grown and investment in bamboo forests or private areas is safe since by a judicious cutting of culms pulp can be produced without any effect on the capital value of the areas. Ochlandra rheedi is common on the West Coast, while Ochlandra travancorica is common on the mountains of Travancore and Tinnevelly. These two species of bamboos were used in the Punalur Paper Mills in Travancore to make brown paper. From the above four species in south Malabar only, according to a Scotch firm whose expert made an investigation on the West Coast their annual demand for 200,000 tons of bamboos could be easily met. Three rarer species Arundinara Wightiana found in Nilgiris and other South Indian hills, Oxytenanthra thwaitesii found in Nilgiris, Western Ghats, and hills of Kurnool, and Oxytenanthra Bourdilloni found on the Ghats of Travancore though yielding good pulp cannot be commercially utilised because of their rarity and consequent incontinuity of supply. Many South Indian trees and shrubs yield bark and fibres which can be pounded into pulp fit for paper manufacture. The stems of Bauhinia Vahlii a common climber of South India, Spatholobus Roxhburghii a common gigantic climber found in the forests of Konkan and Carycopteris floribunda a large shrub common in the forests of Northern Circars and Deccan are used for pulp-making. Fibres of Pandanus odorratisimus common on our coasts are valuble for making paper of good quality. Fibre of plantain cultivated throughout South India is used for making coarse paper. Good paper is got from the fibres of the Deccan hemp, cultivated all over South India and the gigantic "Swallowwort" common in all waste-lands. Waste tow from the extensively cultivated sunnhemp is used in paper-making. Cotton stalks are no good as the short fibres are condemned by the paper-experts as unfit. The bark of the Peepul found more often planted than wild, the banyan common as an avenue tree, species of Sterculia, the babul, the Screw tree common in the dry forests of South India, and Hibiscus tiliaceus common in the Carnatic and West Coast yields good paper-pulp. Paper from the peepul is used in Burma for the quaint umbrellas used there Rarer trees whose barks yield a good paper are the Iron wood of Malabar and Lasiosiphon eriocephalus found in the Southern and Western forests, and Grewia asiatica a tree found all over South India but scattered in its distribution. Prickly pear is common all over South India but the difficulties in the collection and transport and the fact of the percentage of fibre production being low are against its intensive use for paper-pulp manufacture. The China grass of China and Japan used in Europe in the manufacture of paper has been introduced into Madras by the Horticultural Society and into Nilgiris and Wynaad by the Glencock Company. The habitat of the trees which yield softwood useful for pulp making is as follows: Butea frondosa is common all over South India being found chiefly in the plains. Bombax malabaricum is another common tree abundant especially in hot forests. Careya arborea another is abundant in moist forests. Terminalia belerica is common in the forests. Ficus glomerata is common on the bank of all rivers. Mallotus philipensis in another common tree. Two species urens and colorota of Sterculia and Melia composita are also common. The rarer trees are as under:

Anthocephalus cadamba is found wild in South Canara, Malabar, Northern Circars, Cuddapah and Kunrool, Anogeissus latifolia is found in the dry forests of South India while Ehretia laevis and Gmelina arborea are found in the deciduous forests being absent in dry places. The Hogplum and Sterculia urens are found sparsely in the dry forests. Dillenia pentagyna is found in Northern Circars, Nallamalais and Western Ghats. Saccopetalum tomentosum is found in Northern Circars, Deccan and Western Ghats. Tetrameles nudiflora is found in the Western Ghats. Macaranga Roxburghi and M. denticula occur in the Western Ghats. Odina wodier is common on the East Coast especially in the dry forests. It besides yielding a soft wood exudes a gum which is invaluable in paper sizing.

Wood pulp all the world over is now the main source of paper, forming nearly 90 per cent of the pulp used in the manufacture. U. S. A. and Canada the two great centres of pulp production have extensive forests where spruce, pine, etc., are abundant. In the anxiety to get all available pulp, the American manufactureers were short sighted and paid no attention to the vital question of the conservancy of the forests till too late. For 15,000 tons of newspaper 1,00,000 acres are necessary and steps are now being taken to increase the acreage and to conserve the forests. However it is feared the irretreivable damage has been done and the pulp business would collapse at any moment there, as 40 years or more are necessary to lapse between two periods of felling. In our Presidency where as shown above many kinds of pulp may be obtained, there need be no doubt about the ready sale of our pulp increase more pulp than what is locally necessary for papers is made. India imports now 1,50,000 tons of pulp and 1,20,000 tons of paper. So there is no fear of our pulp being surfeited in the markets. From Malabar district alone according to the investigation of a Scotch firm of paper manufacture their annual demand could be met. The common occurence of many of our softwoods and other sources of pulp all over South India make it easy to get the raw materials. The forests are a perennial source of supply but the consideration is the price. Bamboos according to an expert should not be sold to the factory at more than Rs. 15 per ton if the businees is to prosper. Many of the softwoods if purchased say at Madras cost from Rs. 75-150 per ton. The hogplum and Melia costing Rs. 75-100 per ton, Terminalia, Butea and Anthocephalus Rs. 120 to Rs. 150 per ton. The rarer ones, the timber merchants say can be supplied at Rs. 150 per ton if good quantities are ordered. The comparative inaccessibility of our forests and the exorbitant price of the woods because of the absence of cheaper transport facilities are two factors against the success of the pulp industry. The Forest department is doing excellent work in the conservation of the forest capital and so there is no fear of the repetition of the mistake committed in Canada. But the facilities for bringing the timber to the pulp manufacturer must be increased by the extension of roads, tramways, railways etc. Rapid improvements in this direction will enable the pulp makers to get their materials at prices cheap enough to encourage them in this infant industry. Besides the forest resources are the private lands where the soft woods, etc., are obtainable. By judicious cutting with an eye to future prospects these can be made to yield a continuous and sustained supply. Though bamboo because of its cheapness, its comparative abundance and many other advantages it possesses over other materials suitable for pulp making has a great future before it in revolutionising the paper pulp industry in South India, the softwoods can contribute to the stabilisation of the industry because of their wonderful variety, their abundance in our forests, the conservancy of the forests, and thus the guarantee of a continuous supply when the business is seriously taken up by our industrialists. They need have no fear of failure because the demand for paper the consumption of which has been very tritely said to be the measure of a people's culture is sure to be on the increase as years roll on, not only in India but all over the civilised world.

Development of Bamboos from Natural Seedlings.

(Dendrocalamus strictus)

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IN 1911 Professor Troup started a very interesting experiment at Kotdwara in the Lansdowne Division of the United Provinces with the object of tracing the development of *Dendrocalamus strictus* natural seedlings up to their exploitable age and at the same time to watch the effect of protection from grazing on these bamboo seedling areas. Extracts from the earlier stages of the experiment were included in Professor Troup's "Silviculture of Indian Trees" but as the experiment was only half finished when the book was written this note has been written up with the object of enlarging on Professor Troup's observations now that full data are available up to the final stages of the experiment, *i.e.*, the exploitable age of the bamboos

1911. Two plots each about ¼ acre in size were laid out on 1st March 1911 on flat ground in open deciduous forest which was known to be heavily grazed. The plots were fenced with barbed wire and thus closed to grazing. The bamboo clumps already existing had recently seeded and the ground was covered with young seedlings of about one year old, both inside and outside the plots. The object of the experiment was to observe the development of these natural seedlings inside the plot as compared with those outside the plot and therefore subjected to grazing and at the same time to note carefully the rate of growth of the seedlings and to observe the method by which they formed clumps and the period which was necessary to form clumps of an exploitable size

1912. – Observations were made annually and in January 1912 there was already a most striking difference between the grazed and protected areas. Outside the plots the ground was grazed nearly bare and bamboo seedlings were sparse and small. Inside the plots there was a thick growth of grass through which bamboo seedlings were coming up everywhere and varying between 18 inches and 2′ 6″ in height with a few up to 4′ where they were growing inside the old clumps Considerable damage was done by pigs this year and hundreds of young bamboos were rooted right out of the ground.

A few sal seedlings also were observed to be coming up well among the bamboos at this time and had reached a height of about 1 foot in January 1912. They were probably from 1910 seed. Besides the above there was a mass of weeds and young *Millettia auriculata* climbers. The difference between the protected plots and the forest outside which was open to grazing was most striking.

1913.—In January 1913 the plots were covered with a dense growth of young bamboos from 2′ to 4′ 6″ high, most of them thin and whippy with wiry stems. A few of the large ones had culms $\frac{1}{4}''$ in diameter at the base and were fairly stiff and bamboo like. The old bamboo clumps were falling and there was a dense undergrowth of *Cassia Tora* and small *Helicteres Isora*, several young *Kydia calycina*, Sal and other species, and *Millettia auriculata* was rampant everywhere over the old clumps. Outside the plot there was a thick growth of *Cassia Tora* and in spite of heavy grazing young bamboos were to be seen everywhere. The recuperative powers of young bamboo seedlings was strikingly demonstrated this year on the ground outside the plots. In 1912 the ground looked as if not a single seedling would survive the grazing but in 1913 numerous seedlings still persisted. They were badly grazed down and seldom even 1 foot high but they were still alive and plentiful. Where sheltered by the old dead bamboo clumps or bushes they were larger. The whole of this block of forest was fenced against grazing about this time, and the effect of this was most instructive. It is interesting to note that if the fencing had been done two years back there would have been a dense mass of young bamboos probably 3—4 feet in height instead of badly grazed seedlings barely 1 foot high, but it will be seen that this bad start had little or no effect on their subsequent development.

1914.—At the beginning of 1914 the bamboo seedlings inside the experimental plots had reached an average height of about 4ft with a maximum of 8ft. in some cases. They were very dense but still rather whippy with thin wirelike stems although a $1\frac{1}{2}$ inch diameter stem was occasionally to be seen. These were in most cases new culms which had sprung from the rhizome of the original seedlings. The damage which had been done by pigs in these plots in 1912 was hardly noticeable in 1914. The sal seedlings of 1910 were seen to be growing well and had reached a height of about 2′ 6″ and besides these several younger sal seedlings (probably 1912 seed) were observed to be established under the young bamboos.

With regard to the forest outside the plots there was really very little difference to be seen and the recuperative powers of young bamboos and the extraordinary vitality of the rhizomes was again brought strikingly to the notice of the observer. There was a dense mass of bamboo seedlings everywhere and if the fact had not been recorded no one would have suspected that the ground had been heavily grazed only two years previously.

These seedlings averaged about 3 ft. 6 ins. in height and some up to 6 ft. high were observed but except for this slight difference in height growth they were every bit as good as those in the plots.

1915.—By January 1915 the tallest bamboos had attained a height of 17 ft. but the average was about 7 ft. Some stems of 2 8 ins. in diameter were measured but the average was only about 1 inch.

The tallest culm measured, *i.e.*, that of 17 ft. was in reality a new culm which had sprung from the rhizome of a young natural seedling, and was not one of the original seedlings and in fact practically all the large culms were new culms, the seedlings still remaining wiry and grass like and averaging only about 5 ft. in height.

1916.—By the beginning of 1916 the bamboos had begun to form into clumps. These were irregularly scattered over the area and about 7 to 10 ft. apart from one another. The average number of culms per clump was 3 to 5 and the height of the culms was 20—25 ft. with an average girth of about 3 inches. The original seedlings were observed to be gradually dying back and in no case were they seen to be growing up with the new culms. It can be concluded from this that the original seedling's life work is merely to form sufficient rhizome for new culms to spring from and having performed that duty it ceases to develope and is obliterated by the newer and stronger culms.

1917.—By November 1917 there was a dense mass of small clumps averaging 5 culms to a clump with an average mean height of about 16 ft.

From this point the two plots will be shown separately as their rate of growth and developement were rather different.

Plot I.

Mean height 15 ft.

Best clump—height 24 ft., diam. of culms 1·4 in. 7 new culms, 17 old culms.

Plot II

Mean height 18 ft.

Best clump—height 26 ft., mean diam. of culms 1·2 in. 6 new. culms., 15 old culms.

Total culms 24.	Total culms 21.
March 1919.—Average number of new culms per clump, 6.	Average number of new culms per clump, 7.
Best clump.—	*Best clump.*—
27 culms. Average height 26 ft. and average breast girth 4·5 inches.	31 culms. Average height 26 ft. and average breast girth of culms 3·5 inches.

There was no undergrowth in the plots at this period and the sal seedlings which were looking so healthy a few years back had quite disappeared, killed back by the more vigorous bamboos.

The formation of clumps was observed to be developing very slowly.

December 1920.—Average number of new culms per clump, 1.	Average number of new culms per clump, 1.
Best clump.—	*Best clump.*—
33 culms. Maximum height 34ft. with breast girth of 6 inches.	39 culms. Maximum height 36ft. with breast girth of 4 inches.

The absence of new culms was due to the abnormal scarcity of rain in 1920.

Plot I.	Plot II.
March 1922.—Only 2 new culms produced in the whole plot and practically all the old culms are still whippy. This was due to too much over-head shade The plot was very dark and shady.	*Exploitable clumps formed.*—An average of about 4 new culms per clump with a maximum height of 40 feet, minimum height 34 feet. Girth at breast height from 2 in., to 5·5 inches.

Leaving out Plot I which was subjected to far too much overhead shade the fact was established that it had taken exactly 11 years for these natural seedling bamboos to form clumps of exploitable size. Professor Troup estimated that this species would take 12 or 13 years to reach this stage but these natural clumps, even after the very great shortage of rain in 1920, which affected them considerably, reached an exploitable size in 11 years without attention of any sort beyond protection from grazing. They are now ready for thinning in order to remove the congestion and accelerate the growth of new culms. The largest culms have attained a height of 40 feet with a girth of 5·5 inches and with proper treatment these clumps should continue to increase in size and productiveness for many years to come. With regard to the bamboos outside the plots these are to all intents and purposes the same as those inside and the hardships they endured for the first two years of their life seems to have had very little effect. This is probably due to the fact that although the seedling itself was grazed down the rhizomes continued to develop and when the new culms were formed in the 3rd or 4th year there was probably very little to choose between the rhizomes of the grazed and ungrazed plants. If the area outside the plots had been left open to grazing after the first two years there would probably have been a very different story to tell. The experiment was an interesting and instructive one from start to finish and as a result of the accurate observations made the information which it gives is both useful and reliable.

H. TROTTER I. F. S.

A note on the experiments made in the Chittoor District with Atlas A Preservative.

ATLAS A Preservative can be procured from Messrs W. Crowder and Co., Ballard Road, Bombay in one and 5 gallon drums at Rs 12 and Rs. 54 per drum respectively, Ex godown delivery. I have never bought the single gallon drum as it works expensive and the quantity is too small for useful experimental work.

2. As a result of some correspondence I had with Messrs. Crowder, I got them to give me a discount of 5 per cent (to cover distribution charges) because others besides myself had to use the stuff and I promised if it proved successful in the experiments that I was carrying out to influence outsiders *e. g.* ryots and District Board Engineers to go in for it for the destruction of prickly pear. This 10% came in handy and reduced the cost of a 5 gallon drum to little over Rs. 50/- all charges included.

3. Orders should be directed to be booked by goods train as otherwise the Railway freight is excessive.

4. On receipt, drums are frequently found to be leaky and I would advise that in such cases the contents be at once transferred to good kerosine oil tins and the drums made use of otherwise; I have conceived the idea of cutting out the tops of such drums, rivetting stout iron handles on the sides and supplying one or more such to each rest house as a water boiler a most useful article for a camping officer to find in a bungalow. Of course leaks are all stopped up with lead solder which is not affected by water. Good drums ought perhaps to fetch

Rs. 2 to 2-8-0 if sold and this would reduce the cost of the poison, but so far I have not tried to sell any.

5. My first experiments with "Atlas" were made in order to assist certain panchayatdars who complained that the area given to them was full of *seegi* (Pterolobium) which detracted from its value as a grazing ground For the idea itself, I am indebted to Mr. Allen, once Extra Dy. Conservator of Forests, Burma—who some years ago wrote a note about this stuff in the Indian Forester, and, the complaint of the Panchayatdars synchronising with the receipt of a catalogue from Messrs. Crowder, made me write off for a five gallon drum; that was in August 1921. Atlas A preservative is not advertised as a tree killer but as a wood preservative but Mr. Allen noted that it not only kills the tree but preserves the wood at the same time; it was however obvious from his note that he could not give proof of this latter assertion.

6. One of my earliest experiments (September 1921) with Atlas was made with a view to testing Mr. Allen's statement and for this purpose I took up a very large tree of Ailanthus excelsa in the compound of the Palmaner rest house and very close to the kitchen buildings. This tree and another in the same compound had proved to be a great nuisance for they annually produced a huge crop of wool worms which used to freely find their way into the out-houses and into the bungalow also, much to the discomfort of the occupants. The tree near the kitchen was girdled, but not deeply, and the surface of the girdle liberally painted with pure Atlas in September 1921. The other tree was left in tact. The girdled tree has been examined from time to time, the last examination having been made in September 1922. The first thing

that happened, within a few weeks, was that a dark coloured fungus looking growth made its appearence on the girdled surface; this, in some places was in streaks and in others in patches. Later it was observed that the bark (Ailanthus has a pretty thick bark) was drying up and cracking in the vicinity of the girdle but much more so above than below the girdle. These cracks went on extending upwards and as this continued, pieces of bark broke away and the branchlets dried up. In September 1922, the bark from practically the whole of the bole (about 10 feet) above the girdle had come away, and a good deal from below the girdle also; the cracking of the bark had extended to the branches and in the case of some of the big branches a good deal of the bark has fallen off, the branchlets had all died and fallen away leaving the ends of the branches struggling to throw out small shoots and a few leaves. The whole of the crown has a restricted sickly appearance and it will not now be long I think before every branch loses all its bark and dies entirely. Only two weak looking shoots have made their appearance one a little below the girdle and another closer to the ground; these appeared first to my knowledge about the end of January 1922 and since they have hardly put on any development since, they will probably not come to anything. But whether they do or not is immaterial because my object is merely to test whether the poison has really improved the wood and if so in what direction and to what extent. This cannot now be ascertained but as soon as the tree entirely dies, I intend sending duplicate specimen of wood (one from the poisoned and one from the untouched tree) to specialist for examination. I also intend burying one specimen from each tree in an ant hill.

Experiments made to kill out thorny creepers.

On 29th September 1921 in the Gollapalli panchayat area myself and the Ranger with the help of a forest guard cut blazes around the bases of 47 Pterolobium and 4 Zizyphus oenoplia; the blazed surfaces were about six inches long and as near the ground as convenient: these surfaces were then painted with pure atlas. On this we expended a small bottle of the poison, measured to be one-twelveth of a gallon.

The same area was again visited 15th October 1921; the previously attacked trees were examined, in every case the leaves had dried up and were being shed.

Eight coolies were ready on this day and as it was my intention to give the panchayatdars a demonstration they had also turned up. The coolies under the Superintendence of those men were set on to uproot Pterolobium while myself with the Ranger and three coolies undertook the poisoning. The work was timed for 2 hours. We again utilised one twelveth of a gallon of poison and operated upon 53 Pterolobium and Zizyphus bushes, some of which had a basal stem 6 inches in diameter. The coolies in the meantime had done only 24 Pterolobium bushes and naturally they had selected only those which were comparatively small and easily get-at-able. All the 51 stems which we poisoned on the 29th September and the 53 which were done the 15th October were then pegged and numbered.

The same area was again inspected on the 1st December 1921 and as far as it was then possible to tell, every poisoned climber had completely died; a few (three) of the largest were uprooted and it was found that even the roots were quite dead. In the pits from which Pterolobium had been uprooted, small shoots were making their appearance from the cut root surfaces.

One final inspection was made on the 10th March 1922 when I found, to begin with, that people had got into the area and felled and removed many of the dead stems; the pegs had also in many cases disappeared. However I was able to find 63 poisoned stems and of these 25 had thrown out shoots from near the base, in *every* case the shoots appeared from below the poisoned surface. In some cases the shoots were vigorous, in others weak and sickly looking. Both big and small stems had thrown out shoots and both big and small were found to have died out completely. It was particularly noticed that most of the stems which had thrown out shoots were in stony, rocky ground where proper barking right round the stem had been a difficult process in consequence of which the poisoning was in all probability incompletely done. On the flat practically every tree had died.

Adding the three dead trees which were uprooted on the 1st December 1921 we get, in this case, complete death in 41 out of 66 items or 62 per cent. of complete success; but I think it is only fair to assume that the percentage of success would have been much higher if I could have found the other trees, for, as stated, people had been in and had cut away the dead stems for fuel and in the absence of the pegs it was easier to find a stump with shoots than a stump without. However that may be, the only way of trying to get rid of Pterolobium apart from the poisoning method is by uprooting it and on the 10th March 1922 I examined all the 24 pits from which the pest had been uprooted and in every case I found more or less vigorous shoots along the sides of the pits. Quite apart therefore from the cheapness and ease of working with Atlas, it is the only way of killing out Pterolobium.

In concluding this paragraph I must mention that not a single Zizyphus which had been operated upon with poison had thrown up any shoots.

8. Having had considerable experience of working with Atlas preservative and having watched the results of so many experiments made with the poison not only in connection with Pterolobium and Zizyphus but also with Lantana and prickly pear I came to the conclusion that the best results will only be obtained:—

(1). If we work in the hot weather when the sap is low down and the vitality of the plants is at its lowest and (2) if we girdle the trees right low down, if possible even removing the earth from round the base of the tree and then do the girdling. In the case of the experiments referred to in the previous para. the poisoning was done in September and October which are, according to my conclusions, about the worst months in which such work ought to be undertaken and had it not been for the fact that the Madanapalli taluk receives mighty little rain even from the North East monsoon those experiments would probably have proved a complete failure. It must be remembered that "Atlas" is easily soluable in water, so easily indeed that a gust of moisture laden wind carries the stuff and deposits it on areas not touched by the experiment; this I have found happen in Panapakkam where after spraying several prickly pear plots with it on a damp day a fortnight later I found all the pear for a considerable distance on the leeward side poisoned and looking quite yellow. Not only therefore is it necessary to do the work in the hot weather so as to catch the tree when it is least able to resist but it is also necessary to stick to the hot weather months in order to obviate the likelihood of the poison being dissipated.

9. In order to further test the accuracy of the above conclusions the following further experiment was made.

On 12—7—22, 30 stems of each of the following species were selected in the Panapakkam reserve Chandragiri Range and poisoned over blazed surfaces cut as low down as possible after removing the earth from around the base of the stems for a depth of about 6 inches.

Pterolobium indicum	(Yerra seeki)
Zizyphus oenoplia	(Pariki)
Acacia intsia	(Thella seeki)
Pisonia aculeata	(Konkai)
Capparis sepiaria	(Nalla vopili.)

They were inspected on 23—7—22 and all were found to have wilted. They were again inspected on 4-8-22 and it was found that the smaller ones appeared quite dead while the others were dying. They were again inspected on 9-9-22 by the Ranger who reported that the following were living but looking very sick.

Nalla vopili.	13.
Pariki.	1.
Thella seeki.	5.
Yerra seeki.	Nil
Konkai.	3.

In all the others neither did the stems show any signs of life nor were there any shoots from the base.

The Ranger adds the following remark.

"Except in the case of Nalla Vopili which even when completely stripped of bark survive I find in the other cases that the cambium layers (sic) are not completely removed owing to deep furrows at the bottom of the stem or to the stem leaning on the ground for some distance."

In the case of this experiment I must mention that there had been practically no rain in this district from July onwards; the season was an exceptionally dry one and this probably accounts for the complete success with Pterolobium. It is unfortunate that in the other cases the barking was not properly done, and if the killing out of these thorny pests is to be undertaken anywhere on an extensive scale I would strongly advise as a safeguard against the scamping of work in the above direction, that in every case in which the base of the plant is furrowed or is recumbent on the ground, that it be insisted upon that the stem be cut across about 6″ from the base and the basal portion then barked and the poison painted not only on the barked surface but also on the cut section.

10. In addition to the above experiments the following were poisoned in the Avalakonda reserve on 14th April 1922 adopting the same method

25 Tehkka Seeki.
25 Yerra Seeki.
27 Pariki
8 Merapakandra. (Merapakandara.)
8 Puriti.

These have not been inspected by me properly since then but in June 22 when the other District Forest Officers came round for the Conference we went to this place and the stems that we saw appeared to be quite dead.

11. Summing up the experiments made on thorny climbers the following conclusions and figures of cost are recorded:—

(a). Taking a gallon of poison to cost 10-8-0 at work spot, about one-sixth gallon of poison costing 1-12-0 is required for 100 stems of all sizes.

(b). 8 men in two working hours can do the barking around and painting of 100 stems. Allowing 8 working hours per day and 5 annas per day per man, labour costs 10 annas.

Total cost per 100 stems is 2-8-0.

(c). Pure poison should be used.

(d). Powdered chalk should be added to the poison before use as this on drying will show a white surface and enable one to decide whether a particular tree has been painted or not.

(e). Work should be done on a dry hot day at the beginning of dry season if the best results are to be secured. Quicker and more satisfactory results are obtained from stems out in the open exposed to bright sunlight rather than from those in dense moist jungle.

(f). The bark must be *completely* removed from *all round* the stem for a length of at least six inches and as near the ground as possible. Pure poison should then be painted on all over the barked surface. The nearer the barking is done to the ground the better and where practicable the earth around the base of the stem should be dug away so as to facilitate very low girdling.

(g). In the case of many of these climbers (particularly Pterolobium) we frequently get a very short even less than six inches main stem and they are frequently found on stony ground which does not admit of a hole being dug around the base; in such cases and in cases in which the bases of the stems are furrowed it is necessary to cut across the stem 4 or 5 inches above the ground, then bark all round the stem and then apply the poison not only to the *barked surface but also to the cut section.*

The same thing must be done when the lower end of the main stem is lying prone upon the ground.

(h). Provided work is done on a dry day in the hot weather and provided the barking and painting is properly done as described above, cent per cent success can be assured in the cases of all the following climbers.

1. Pterolobium indicum.
2. Zizyphus oenoplia.
3. Acacia intsia.
4. Konkai (telugu).

In case of *Nalla vopili*, however, it appears that we can only expect about 80 to 90% of success.

12. It was a little time after commencing operations on thorny climbers that the idea struck me to try the poison on prickly pear.

The very first thing done was to dab (with a brush) pure poison on very small prickly pear a foot high. Isolated shoots of pear were operated upon and the dabbing was made on the uppermost cladodes. In a week's time the shoots roots and all had become quite rotten and soon after there was nothing left of them. This was in good dry weather at the end of September in Madanapalli.

Noting results on the small pear I dabbed with pure poison several of the cladodes of a huge clump of pear about 7 feet tall. The poison from those cladodes was evidently absorbed by the whole stem and within a fortnight what was an erect bush of pear had become very like what one might imagine to be the same bush attacked by a severe form of leprosy; all the upright branches had lost their regidity and were drooping over.

I saw the same bush a couple of months later and there was very little left of it, but from the lower thick portions new shoots had begun to sprout.

In the meantime i. e. on 7th November 1921 one twentieth of of an acre (roughly measured) of very dense prickly pear near the Gadanki village was sprayed over with a solution of poison (1 of Atlas to 3 of water). In this case the quantity used was measured and it was found at that strength it would cost about 150 per acre for poison alone.

On 8th November 1921 three batches of prickly pear near the rest house at Panapakkam were sprayed over with poison using 1 to 4, 1 to 5 and 1 to 6 solutions respectively.

On 10th November 1921 four patches in the same locality were sprayed over with solutions of poison made with boiling water using 1 to 3, 1 to 4, 1 to 5 and 1 to 6 respectively.

On 16th November 1921 three patches were sprayed over in the same locality with cold solutions made up 1 to 10, 1 to 15 and 1 to 20 respectively.

NOTE. The spraying was done with an ordinary garden hand spray.

In all the above cases it was noticed that in about 3 to 7 days (varying according to the strength of the solution and the size of the pear) the pear assumed a sickly reddish appearance, which gradually assumed a yellowish tint as decay proceeded.

Observations were made from time to time thereafter but it was exceedingly difficult at each observation to point out to any particular difference between the plots, the sum total of these observations are therefore put down as follows:—

(1). With small prickly pear (under say 2 feet in height) the effect is very much quicker and more thorough than with bigger clumps.

(2). Only the smallest pear is killed out-right by the stronger solutions which however cannot be thought of the financial reasons.

(3). No appreciable difference was noticed between spraying in the morning and spraying in the evening nor between hot and cold solutions.

(4). All prickly pear clumps except those mentioned in (2) above, die down in from 20 to 40 days depending on a large number of factors such as (a) size of the pear (b) dryness of the locality (c) dryness of the atmosphere (d) strength of the solution; after drying down like that there seems to be a short interval and then come a number of new shoots. The size and strength of the pear appear to be the most important determining factors and it is the thick strong clumps which seem to dry least and throw out the new shoots quickest.

13. Other plots were experimented upon with solution varying from 1 to 30 to 1 to 200 and always with similar results. Using a solution of 1 to 200, I have worked out the cost at about Rs. 5 per acre for poison only put we must of course allow for uprooting and burning the pear after it has been poisoned.

I have had considerable experience of prickly pear removal in Central Coimbatore and I invariably found that the greatest difficulty in eradicating this pest was to get to dry sufficiently to secure a burn, and no matter how careful one was, there was enormous wastage of labour because unless the uprooted heaps were continuously being turned and a torch put into them they would begin to grow again and if in the meantime a shower of rain came down it was all up It is just here that the usefulness of Atlas preservative come in for it does kill down the stuff to some extent and does cause a fair proportion of the whole bulk to dry up and with this inflamable material available to begin with, burning is considerably facilitated.

Moreover with a considerable proportion of the pear in a dead state uprootal is made a very easy.

It is however most important that the uprootal and burning be done at the correct time, i. e., just after the pest has dried up and before it begins to throw up shoots.

This period varies from 5 weeks to 7 weeks

A. M. C. LITTLEWOOD,
District Forest Officer,
Chittoor.

Why the old period of July to June is preferable to the present one of April to March in the working of Timber and fuel-coupes.

Under the present system of working, our timber and fuel coupes are leased out from the 1st of April each year to the 31st March of next year. Usually the coupes are advertised for sale early in March, and are sold about a month later. In cases where the sale has to be confirmed by a higher authority, the contractor generally begins work by the 1st of May, after executing the necessary agreements, and arranging for his coolies and gumastahs. He works for a month or so, after which the monsoon sets in, and his work of felling and transport suffer considerably, and in some cases becomes almost impossible. It is not until October or November that work can be resumed.

By this time agricultural works will have commenced, and coolies prefer working in field crops to working in forest felling areas, for, in the former case, not only is their work more conveniently situated, but they are usually paid in grain, and not in money. In a few cases, perhaps, land-owners do pay their labour in cash, but their rates are always in excess of those adopted by the department, or coupe contractors who can ill afford the liberal rates of the land owner. It is therefore not difficult to see the reason why forest work suffers during the season of agricultural activity.

In some places the coolies themselves are petty land-owners, and this state of affairs only tends to increase the labour difficulty.

The harvest closes by February when the contractor, now able to procure the necessary labour, hastens to complete his work by March which marks the expiry of his lease period. It is therefore not surprising that large areas are left unworked annually, while the work which has been done hurriedly is unsatisfactory, and against sylvicultural principles. Penalties and fines are levied for extension of "voidahs" and irregularities. These discourage contractors who are already put to undue expense, owing to the greater portion of their lease period either coinciding with the cultivating season or being rendered impossible for working by the monsoon rains.

Taking a lenient view of the case, and considering the short working period at the disposal of the forest contractors, irregularities which have to be rectified not only causing pecuniary loss to the contractor concerned, but also having a detrimental effect on our forests, are not to be wondered at.

By the 1st of April the new coupes are sold, in the majority of the cases, to other contractors and the coolies seizing their opportunity, take advances from both the contractors with the result that control over them is lost, and a contractor is unable to extract better work, for fear that they (the coolies) will run away to the other man's coupe. Thus there arises many difficulties, and it is often impossible to adhere to the prescriptions of the working plan.

Some years ago, coupes were leased out from the 1st of July every year to the 30th June of the succeeding year. Under this system contractors had sufficient time in that they had a continuous period of four months of non-agricultural activity (from March to June both inclusive) during which coolies and carts are available for felling and transport operations. He could then satisfactorily and without undue rush complete his work within the lease period.

Contractors represent that not only do they lose under the present system—*i. e.*, 1st April to 31st March—but that a re-adoption of the old one would bring about greater competition, and consequently higher bids at the annual sales of timber and fuel coupes.

R. ALAGIRISAMY NAIDU,
Range Officer,
Sriharikota Range.

A Visit to Edavanna Rubber Plantations.

General Account: RUBBER is the dried product of the latex found in the cortex of some of the natural orders yielding milky juice viz., Apocynaceae, Urticaceae, Asclepiadaceae & Euphorbiaceae Chemically it is a hydro carbon (containing hydrogen and carbon) insoluble in alcohol, acids and alkalies but soluble in carbon-disulphide, chloroform, oil of turpentine and some other oils. It is an elastic substance impermeable to water but not impervious to gases.

Para RUBBER of commerce is obtained from the evergreen tree 'Hevea brasilensis' an exotic from the Amazon Valley.

The earliest introduction of this tree into Southern India was in the year 1879. The blanks in the 1853 Teak Plantations of Nilambur were planted up with twenty eight plants of HEVEA received from Royal Botanic Gardens, Ceylon. As they were not properly looked after, many of them died, but such of them as are surviving, are at the request of some of the planters left standing to die a natural death to see how long the tree is capable of surviving.

The first rubber estate in Southern India was started in 1902 at Thattakad on the banks of the Pereyar river in Travancore. The Edavanna Plantation is one of recent origin. It was planted in 1911 and tapping commenced in 1917. The plantation of 912 acres is divided into eleven plots varying in extent from 50 to 150 acres.

The tree is found to thrive best in localities with a warm and equable temperature ranging from 75 to 95° F. and a well distributed rainfall of 70 to 150 inches. Continuous heavy rains with long intervening periods of drought are unfavourable. A valley well sheltered from strong and dry winds with an elevation not exceeding 2000 feet, neither swampy nor water logged is most suitable. The soil should be a moist porous loam containing a fair percentage of clay and the sub soil well drained but not sliff or clayey.

Raising of Plantation: The existing jungle growth was clear cut and burnt. Seeds of HEVEA obtained from Ceylon were first put down in a nursery and watered twice daily—both morning and evening. The plants were pricked out of the nursery beds after

3 or 4 months and planted 4 to 6 inches apart. Fourteen to fifteen months afterwards, the plants were stumped up to 18 inches above and below ground level and put down in pits 2′ × 2′ × 1½′. The spacing was 20′ × 20′, that is, about 108 trees to the acre. Stumping and planting costs about Rs 6/- per 100 plants.

Tending: The seedlings were weeded during the early stages of their development. Water and leaves falling on the floor are prevented from being washed down the slopes and are collected by a system of intermittent drains 10′ × 2′ × 1½′ sunk along the contours and 10 feet apart.

The tree sheds its leaves normally once every year, in February, but in Edavanna a second leaf fall occurs during July and this is attributed to an insect attack. The insect pupates in the fruit and causes the drying up of both the foliage shoot and the fruits. The spread of the attack is prevented by removing and burning all dead (i.e. infected) branches, fruits etc., and burying the ashes. The trees are some times pollarded at a height of 10 to 15 feet from the ground to encourage forking as it is supposed that such trees put on more increment in girth than those with a class straight bole, but the formation of too many branches is prevented by pruning. Large branches are not pruned.

The system of pollarding is not resorted to in Edaranna as it is believed that the operation encourages disease and the consequent production of inferior quality latex.

Tapping: Trees 18 inches in girth at 18 inches from the base are ready for tapping. This size is attained in 4—6 years in South India. Younger trees are not tapped as the latex obtained from them is inferior. The latex vessels are essentially long branching structures running vertically down the whole periphrey of the stem. They consist of "Coenocytes" and the tubular milky branches do not run into each other. The ingredients are generally water containing various substances either in solution or in suspension. In HEVEA, the latex contains elongated minute rod like or dumb-bell shaped starch grains.

The upward passage of this milky latex is interrupted in tapping, which consists of horizontal cuts into the cortex. In practice, to make the latex flow down easily, slant cuts are indicated. The cuts should not extend for more than half way round the stem so that the injury to the plant may be confined to a minimum.

"Wound response" is the phenomenon underlying the principle of tapping. The first flow of the latex, may be, and as a matter of fact is usually comparitively small; but the wound stimulates a greater yield, and a higher flow of latex in its immediate neighbour-hood—generally within the next period of twenty-four hours—results. This peculiar, behaviour of the tree viz., 'responding to wounds' is taken advantage of and the following two rules are laid down for tapping HEVEA trees: (1) The cuttings or rather incisions should be successively made at one and the same place and (2) A period of 24 hours should elapse between any two successive cuttings.

It has been found from experience, that, a tree from which the cortex is pared off 1/30 of an inch every day is capable of yielding latex which will flow intermittently for a period of six years The tapping commences at a height of about 2 feet from the ground level and extends to one half the circumference of the tree during any one year. A width of one inch of the cortex is incised in the course of a month, or about 6 inches in the season.

The succeeding year the other half of the stem is similarly operated on. In the third year, therefore, the same side of the tree as was tapped in the first year would be taken up, but the actual incisions would be placed higher up than originally. Generally the incisions should not be facing the direct rays of the sun as the flow of latex would then be less and would coagulate very soon.

The incision, made by a special kind of chisel, is slanting at an angle of 60° to the longitudinal axis of the tree The latex flows down to the bottom of the cut and is led into a receptacle through a small grooved tin plate. There are several patent wire stands for collecting the latex, but their cost is prohibitive. In Edavanna it is collected in cocoanut shells, propped between a stick and the tree.

Tapping is done early in the morning, as the flow of latex gradually decreases towards noon and its collection becomes more difficult on account of "Sun coagulation." Each cooly can tap 450 trees in a day. He pares off the cortex of the trees alloted to him in his plot—(half a minute per tree being spent over this operation) — and when all the trees have been incised he goes round to collect the latex For the latter operation he is provided with a tin bucket with the number of the plot marked on it. The actual rubber producing material from 450 trees is 5 pounds approximately. The coolies are apt sometimes to adulterate the latex with water. This is prevented by testing the specific gravity of the liquid with an instrument known as "the METROLAC."

There is no tapping during the months of February and March and sometimes also during the first half of April. The reason for this is, that not only is there very little latex yielded by the trees during this period of rest (leaf shedding) but also, what little is obtained, is difficult to collect on account of rapid coagulation. On days of heavy rains during June and July very little collection is possible owing to the latex getting mixed up with a large amount of water.

Each cooly employed in the estate is paid an advance of Rs. 10/- and Rs. 1—8—0 per week. To prevent them from squandering their earnings, only such amount as is absolutely required for food and clothes is disbursed to them from time to time, the balance, less the advance, being paid in a lump sum when wages are settled periodically. There are 210 coolies employed for tapping in the Edavanna Rubber Estate.

Preparation of Rubber: The yield of dry rubber is about one pound per tree or 200 lbs. per acre per annum.

Solid RUBBER is prepared by the coagulation of the latex with, generally, Acetic acid. There is one disadvantage in preparing rubber by this method viz., that it is liable to turn out mouldy but this is obviated by preparing the RUBBER in thin sheets, which enable it to dry easily. Corrosive sublimate (Mercury perchloride) is a better preservative and a more efficient curative but it is a very poisonous substance and therefore risky to handle.

The latex that is brought in buckets is first strained by allowing it to pass through a thin perforated tin tray. To this is added water in sufficient quantities to bring it to a uniform consistency of 1½ pound of rubber to the gallon. The diluted latex is then poured into wooden trays 1′ × 1′ × 1′ arranged in lines one line for each plot. In Edavanna wooden trays are used but as they are difficult to clean, the question of using kerosine oil tin trays instead is under consideration. Next a small quantity of acetic acid, of 1/40 concentration, is added and wooden partitions 1′ × 1′ × ½″ are inserted vertically into the trays to separate the liquid into 6 compartments. In about an hour the solution coagulates into blocks each about 1½″ thick. They are however allowed to remain in the wooden troughs till the next morning when they are taken out for squeezing. They are first of all placed between the circular rollers of a squeezing machine which takes out all the water from the rubber blocks and compresses them into sheets ¼″ thick. They are further subjected to a second and third rolling in machines provided with double rollers which not only reduce their thickness further but also impress a diamond pattern on their surface both upper and lower. The rubber sheets are kept immersed in water before and after rolling to make them tough and clean.

The sheets are next subjected to a process of "Smoking." For this they are hung upon wooden stands loosely arranged in a closed room, kept at a temperature of 110°F. The smoking apparatus consists of small closed tins in which a few shells of cocoanut are burnt. The smoke is conducted into the smoking room by means of a delivery tube passing through an opening in the tin. The smoking lasts for 4 days and this causes the sheets to turn dark brown, almost amber in colour when looked through They are thin removed, brushed and cleaned with a brand of "Monkey Soap."

The drying takes place in a closed room, (the arrangement of which is similar to that of the room described above,) into which hot steam is passed, the temperature being 110° F. This operation lasts for 8 days.

The sheets are then ready for the market. They are grouped into 4 classes viz: Broad light, Broad dark, Narrow light, and Narrow dark and are packed separately in locally made wooden boxes (of Vateria Indica or Bombax Malabaricum) 2′ × 1½′ × 1¼′. There are several varieties of patent packing cases, but the local wooden boxes are said to be less costly and more durable. Each of the latter boxes when furnished costs Rs 1-12-6. Each sheet of RUBBER weighs from 10 to 12 oz. and 150 lbs. are contained in one box.

According to the market value there are two grades of RUBBER viz, (1). First class: free from defects, uniform in size and bright amber in colour. (2). Second class: smoky and dark in colour. The superior variety fetches a price of 73 cents per lb in Ceylon, to which place the whole quantity is despatched.

Scrap Rubber. The dried latex left in the shells and that obtained from coagulation on the cuts of the tree after the day's supply has been collected is made use of in preparing "scrap rubber." The material is put into a large tub of water, washed and pounded. This cured stuff fetches a price of 48 cents. per lb.

The estimated annual income from the Edavanna plantation is Rs. 180,000.

This Industry is no doubt a very paying one, but as it, at present, concerns the planter more than the Forester, the Hevea plantation is not being worked by the Department of late.

K. SANKARANARAYANA RAO,
M. F. C. 1921-23 Division.

Village-War Lump Sum Grazing Revenue System.

In the issue of the Madras Forest College Magazine for December 1922, I read an article from the pen of Mr. R. Alagirisami Naidu, Range Officer, Sriharikota, Nellore District, under the above heading. It is therein stated that owing to the semiwild nature of the cattle in the Sriharikota reserved Forest, the Forest Subordinates find it very difficult to collect grazing revenue every year, owing to their inability to impound the cattle, and that the owners taking advantage of this, boldly evade the payment of grazing fees. In answer to this I must state that all cattle owned by the Villagers are not of a semi-wild nature, but only between 100 and 200 (roughly) are such; and the rest, the major portion, are domesticated animals. No grazing fees were ever attempted to be collected for the semi-wild animals in previous years for the obvious reasons that the correct numbers owned by individuals were not ascertainable nor could the owners be pitched upon.

He also mentions in the article that "the question of illicit grazing automatically disappears" as one of the advantages (among others) of the system. I am not sure if this is really the case.

My experience of Sriharikota Range, which I held charge of for over 7 years during different periods between the year 1899 and

1916 is quite otherwise. The semi wild nature of the cattle is due to the primeval system of rearing and breeding Cattle practised by the villagers of the place. Since this system is advantageous to them in more ways than one, they are reluctant to change it. The advantages of the system are :—

1. The feeding costs nothing, since the Cattle graze freely in the reserve.

2. The Cattle take care of themselves, and no grazier is required.

3. The Cattle become healthy and robust as a result of their free lives and the ample fodder supply.

4. Calves are born in quick succession and

5. The bulls fetch higher prices when sold.

When the calves are still young they with the mothers are caught with the aid of dogs and tamed. After the season of milking is over, they are again let loose in the forest after having been branded with some marks for future identification of the owners-ship. After a few days of freedom these Cattle, though once tamed, again resume their wild nature The calves inherit this nature from the parents and always run away with their mothers, whenever any human being approaches them, or when they are disturbed in their solitude. They have no partiality towards their owners, as stated in the article: Owner or no owner, the effect is the same and it is an interesting sight to see a herd of these Semi-wild Cattle stampeding in different directions into the thickest portion of the forest By this system of Cattle rearing, practised by the Villagers, the number of Semi-wild Cattle in the forest is maintained or is on the increase.

Sriharikota reserve, as it is, with sandy loose soil affords no grazing for cattle and in a very few places called "Vagus" (streams), grass attains a length of just a few inches. There is practically no fodder in the reserve and the cattle generally feed on leaves all the year round. The closed coupes are their favourite haunts, since these coupes afford food in abundance in the shape of succulant coppice growth and that within easy reach. The next most frequented resort is the area under felling, and the cattle can often be seen wending their way to feed on leaves of the felled trees. They not only constantly nibble the ends of tender coppice shoots, which stunts the growth, but also trample the young shoots under foot which often results in the destruction of a good crop. There is little doubt that these Semi-wild Cattle are a pest to our forests.

The condition in the agreement under the above System that "the people should pay particular attention that their cattle do not enter the coupes closed to grazing" sounds very well on paper; but in practice, it is probably, a dead letter, whatever may be the exertions made to enforce it, because, these cattle abound in the closed areas, where they get an ample supply of succulent young shoots. The condition that "the Villagers should take an interest in the proper maintenance of the fence round felled areas" will hold good in the case of the domesticated animals but not in the case of Semi-wild Cattle, as the latter jump over these fences very easily and enter the closed areas. I have known Semi-wild Cattle (after they were caught with the aid of dogs and impounded) to jump over solid masonry bound walls 5 feet high and escape into forest.

It will therefore be seen that the illicit grazing does not and will not disappear, as long as this practice of maintaining Semi-wild Cattle is permitted to be continued by the Villagers. If the custom is allowed to prevail no conditions and no changes of system will put a stop to the illicit grazing.

Catching Semi-wild Cattle with the help of dogs and impounding them (which I have done in large numbers, probably to the largest extent that ever was done by any Ranger, prior to and after me,) was found ineffective, for, as soon as the owners obtained their release from the pound after paying special enhanced rates of pound fees, the cattle were liberated at the gate of the pound itself and allowed to stay back into the forest. Catching these wild animals is almost a special art in Sriharikota, for men and dogs have to be trained for the purpose. It is not every one, that can do it. To catch one animal it takes at least half a day. The animal has to be chased in the sandy soil for hours before it can be approached and when it has become exhausted the dogs catch it and hold it firm, when men coutiously pass a noose round its neck and tie it to the nearest tree. Sometimes it takes one or two days to catch one animal. All this time and exertion spent in catching them, becomes a mere waste, when the Cattle are let loose into the forest again. The shooting of these animals was pronounced to be sacriligious and was not approved. Acquiring the enclosures situated within the reserve would not mend matters, nor has the kancha system been found to be a solution to this difficult problem.

The new method introduced during the current year and known as "The village-war lump sum grazing revenue system" does not, in my opinion bring us any nearer to a satisfactory solution to this question of illicit grazing. The cattle census figures obtained from the Revenue Department is the basis of the system and the system therefore is open to the following objection. (1) The census is taken once in 5 years and within this long period, great changes occur ; (2) The enumeration is made by the village officers of the concerned villages, who take into account only the domesticated animals. It can perhaps be presumed that the illicit grazing regarding the domesticated Cattle in open areas, has disappeared under this system, if the Revenue figures are correct. But this will not actually be the case unless the Villagers are prevented from transferring cattle villages not included under this system, or from making additions from out-side, to the already existing number as enumerated by the Revenue Department. No doubt "the Villagers think that this system is a great improvement on any previous system" because all their machinations escape detection under this system. The Semi-wild Cattle found in the reserve do not find a place in the cattle census account; further it is neither possible to count them nor to state who the owners are. Thus one connot see how the illicit grazing of Semi-wild Cattle in open areas has disappeared by the introduction of this system and I need not state how impossible it is for any body to say that the illicit grazing has disappeared from the closed areas.

All the methods tried by the Department in previous years to improve the state of affairs in the Sriharikota reserve have proved futile and in view of what has been said above, the present "Lump sum" system may share the same fate. I woud therefore suggest a new method, which has hitherto not been tried. My proposal is to exterminate entirely all the Semi-wild Cattle from the reserve I do not use the word "exterminate" in the sense of killing, but I use it in the sense of removing the Cattle wholesale from the forest. In the first instance I would suggest that the existing practice of allowing the cattle to wander at their will and become wild should be suppressed. The animal once caught must be tamed and stalled. If this is not possible, it must be caught and sent out of the island.

The following rules will have to be observed, should my proposal be brought into operation.

1. As a concession, the Villagers (owners) may be permitted to catch their animals, tame and keep them in their villages, or to take them away to the mainland and dispose of them there. A time limit of 6 months, or even a year, may be fixed for the purpose.

2. After that period, the Department may undertake to catch them with the aid of men and dogs. After recovering the expenditure incurred in catching, the animal will be handed over to the owner, who either tames and stalls it or takes it outside the island for disposal.

3. Before the animal is handed over to tbe owner, it must be branded with letters" "F.D." and a serial number on the body for identification at a future date. If necessary a register should be maintained showing the date, branded number, name of owner with address and place of residence and a short description of the animal. The signature of the owner will have to be obtained against the entry in token of his ownership. This will serve as evidence in the event of further procedure being considered necessary. If the animal is disposed of outside the island, a certificate from the Village Munsiff concerned should be produced giving the name of the person, address etc. to whom it was entrusted or sold and noting the number branded on the animal.

4. When there is no claimant for an animal caught, it becomes the property of Government and the Department will dispose of it. If a Villager belonging to Sriharikota purchases it, he will adhere to the alternatives mentioned above and if the sale cannot be effected locally the Department will send it to the mainland, to be sold. In these instances also certificates from the Village Munsiffs are essential.

5. If, on any account, the owner neglects to abide by condition No. 2. and allows his animal to re-enter the forest he shall be made liable to prosecution and punishment. When the animal is caught by the Department for the second time, it should absolutely become the property of Government, who will dispose of it as stated in condition No. 2.

6. Purchasers of these animals outside the island will have to bind themselves not to allow the animals to wander about the country or to re-enter Sriharikota. The defaultars should be liable to prosecution and punishment.

By adopting this method, the number of semi-wild cattle will gradually decrease and in course of time they will become extinct and the Sriharikota Reserve will be free from this havoc which is at present causing a considerable amount of damage. This strong action is quite essential for the improvement of the reserve. I cannot adequately dilate on the importance of this reserve, which is very valuable, and if efficiently protected will be one of the important sources of fuel supply to the city of Madras for generations to come as it is situated within easy reach of the city and connected to it by an easy route, the Buckingham Canal.

The narration of a legend connected with this forest will not be out of place here. When this forest was under the control of Polayagars, a woman going through the forest from one village to another with butter-milk for sale, broke a few branches of a plant with which to cover the earthen pot to prevent the butter-milk from spilling while walking. This went to the notice of the Polayagar, who, as a punishment, made the woman water the plant with butter-milk daily till the plant revived. Even in those olden days, the importance of forests was realised and their deterioration guarded against.

Unless the semi wild nature of the cattle is improved and gradually suppressed by domestication, or the Cattle sent right away, out of the reach of these forests, the existing systematic illicit grazing in Sriharikota reserve will not disappear and as long as it continues the condition of the forest will not tend to improve but will continue to deteriorate.

C. Balayya Naidu,
Forest Ranger (on leave).

Selection, Felling, cleaning and disposal of Sandalwood in Denkanikota Range.

In writing this essay, I think I need not give an account of the locality and nature of the Sandal areas in the Denkanikota Range, as these have been fully dealt with in the pages of this Magazine issued in March 1919. I am here trying to explain, to the best of my ability, the manner in which the extraction is carried on, the precautions to be taken in conducting the several operations and the registers maintained, and how they are posted up, until the wood is finally despatched. These points will, I hope, interest such of our readers as have not had the opportunity of dealing with the operations themselves.

Although the scheme described below has been drawn up with particular regard to Denkanikota Range, the principles underlying it are of general application.

The work is carried out strictly in accordance with the provisions of the Working plan prepared by Mr. C. C. Wilson I. F. S., the present Principal of the Madras Forest College. The plan has been in operation since 1917, and under it the whole sandal area is divided into 7 Felling Series of 6 coupes each. There are thus 7 coupes worked annually and the whole area is worked over in 6 years. Dead trees only are extracted from these areas under the system of ' Improvement Fellings."

Subsequently as the result of the rapid spread of the spike disease in several new sandal areas a second series of felling became necessary. The infected areas are treated simultaneously, new areas being taken up as spike disease shows itself. The operations consist of the entire removal of diseased trees (which is explained in detail further on) and proceed simultaneously with the Improvement Fellings in the event of the spike occurring in the Improvement felling coupe of the year. By this process it is hoped to eradicate the disease. The spike areas under working are (1) Javalagiri Bamboo Block areas I to V (2) Gottinatham spike area (3) the Hojanahatti spike area. Each of these areas is incharge of a Forester who is expected to work through his area within the year. In addition to this staff, there are 7 Foresters each in charge of a Felling Series. There are also 4 Section Officers who are also Foresters, and who not only look after their sections, but are in charge of the Minor Spike areas such as Aiyur, Nelgundi, Noganur, and Thally. In these minor areas, Spike appears on a few trees occasionally and the infected trees are removed then and there.

Enumeration.

In the Felling Series the Foresters on receipt of orders from the D. F. O. begin the enumeration of dead trees about the end of May at the latest.

In Spike areas the enumeration and extraction are carried on throughout the year. The enumeration is begun from one end and is carried on untill the whole area is finished.

The details of the enumeration, such as, the date, number, girth at 4 feet from the ground, length (the approximate length of heartwood limit) and the locality of each tree are entered in a printed bound book, known as Form I (a). In remarks column some particulars about the state of the tree are noted. Among such particulars will be found, 'completely dead', 'Fully Spiked', 'Spike just begun', if dead. whether 'fallen down' or 'standing', 'purely heartwooded' (the sapwood having been eaten away by white ants) or 'fallen pieces'. At the close of each week, the Forester submits with his weekly diary, a copy of the sketch of the area showing the portions enumerated, a copy of the list of trees enumerated in the week as per his Form I (a) and a statement of the girth and diameter classes of the trees as prescribed in Appendix II of the sandalwood rules framed by M. R. Ry. Rao Saheb K. R. Venkataramana Iyer Avl. I. F. S. The Range Officer inspects the enumerated areas frequently and satisfies himself that no dead trees have been omitted in the enumeration and that all the disceased trees have been included in the enumeration of Spike areas. In the latter this check is seldom possible, as hitherto unattacked trees show signs of Spike within a period of 20 days. The main object of the Range Officer's inspection is to see, if the Forester has enumerated all the spiked trees at the time of his enumeration. Recent attacks are easily detected.

On completing the enumerations, the Foresters submit in duplicate, copies of their Form I a), a consolidated diameter class statement of all the trees and a full sketch of the area showing the positions of the trees enumerated On receiving these records, the Range Officer prepares estimates for extraction and eradication and submits them to the District Forest Officer for necessary sanction. In the case of Felling Series, no extraction is begun, untill the sanctioned estimate is received, whereas in the case of the Spiked trees, the Range Officer issues orders to begin extraction in anticipation of the District Forest Officers approval, so as to give the disease as little chance as possible.

Extraction.

A trench is dug round both dead and spiked trees at a distance of 2 to 3 feet form the collar of the tree. In the former case all lateral roots are cut clean, so that the trees fall of their own accord. No roots containing a section of heartwood equal in area to the size of a rupee should be left underground. The trees are rough cleaned on the spot and transported to the Forest Depot. The sapwood trees, if any, are also collected and kept in a heap for inspection by the Range Officer. In the latter case—i.e., in the case of the spiked trees, the extraction is rather difficult. A trench of about 3 feet in width to a depth equal to the depth to which the roots have penetrated, is dug round the tree. All roots which are removed during the excavation are carefully collected and heaped up. On the fall of the tree, all branches containing no heartwood, twigs and leaves are cut, and heaped. The trunk branches and roots containing heartwood are then rough cleaned leaving only a thin film of sapwood to protect the heartwood. The rough cleaned wood is transported to the Forest depot and then chips resulting from the rough claning are also collected and heaped. These heaps are there thoroughly burnt as soon as possible. The spike trees and seedlings containing no heartwood have also to be kept for inspection by the Range Officer.

After the rough cleaning is over, the trees should be billetted in such a way so as to allow of easy transport. If the root is big enough it is sawn off at the crown, so that, as little stemwood as possible is taken with it. The object of this is to keep the rootwood separate from the stemwood as the former is more valuable and mixture is therefore undesirable.

The following rules are to be adopted when billetting in the Forest depot. (1) As the price of sandal billets is in proportion to their straightness, the billetting should be done as far as possible at the bends, so as to have the billets as straight as possible.

(2) As a straight billet 3 feet in length is more valued than a straight one 1 foot in length, the billets should be cut in such a way so as to get straight pieces of 3 feet length (3 feet appears to be the maximum required by the market). The length of the pieces immediately after rough cleaning should as far as possible be either 3 feet or a multiple of 3 feet.

(3) The branches should be cut quite flush with the main stem. All pieces are then carefully numbered as per instructions given in the Rules book mentioned above. At the end of each day Form II(a), which gives the list of trees uprooted and the particulars of the trees roughly cleaned and billetted, and Form no 8 which gives the details of the receipts for the day, should be posted.

When felling is in progress, the Range Officer inspects the Coupes as often as possible checks the sapwood trees and puts his initials against each of the trees in the remarks column of Form II (a). When the whole stock of sapwood trees is checked the heap is burnt and the Range Officer certifies in the Forest depot Forms 1 and 9 that the trees shown in columns 1 to 5 in the respective registers have been verified and burnt by him on the particular date in question. The felling should proceed serially and under no circumstances should axes or bill hooks be used for separating branches or roots which contain heart wood, the axe being generally used only in rough cleaning the spiked trees.

When a sufficient quantity of rough cleaned wood is collected the Forester prepares his invoices and despatches the wood to the final cleaning depot at Denkanikota. The following rules should be followed in despatching a consignment:—

(1) Four Copies of the Invoices (*i e* Copies of Form II(a)) are to be prepared and at the end of each copy, an abstract showing the following details should be given:—

(a) the number of the trees covered by the consignment (b) the number of pieces obtained from the roots with their weight (c) the number of pieces obtained in billets and their weight and (d) the quantity of sawdust obtained in billetting. The total weight of the consignment should also be stated.

(2) An escort usually composed of two Forest guards, should be arranged for in the case of each consignment. The consignment should be loaded into carts in their presence and their signatures, for having received the consignment as shown in the particulars of the abstract, should be obtained in the registers of Form II (a) All sawn

ends of pieces should be hammer marked with the hammer provided for the purpose and a waybill and yellow permit as shown in Form I of the Forest Manual, should be prepared and pinned together with a copy of the invoice, This file with 2 additional copies of the invoice should be handed over to the escorts for delivery to the depot keeper at the Final cleaning Depot. The fourth copy of the invoice together with the duplicate of the way permit should despatched directly to the District Forest Officer immediately the carts leave the Forest depot. The disposal of the trees is then entered in Form no 9.

The Final cleaning depot consists of two sections:—viz Final cleaning section and Finally cleaned section. Two sets of Forms 8, 9 and 10 are maintained one for each section. In addition the invoice files received from the Forest depots are filed in this depot. On the arrival of the wood from the Forest depot, the escort arranges the trees in serial order as per invoice and fit in all pieces of each tree so as to complete the trees as they stood in the Forest. The invoices are handed over to the Depot keeper who checks the pieces of each tree, their measurements and their weight. The details are written on the back of all the invoices, irregularities if any being noted. The escorts, signature is taken in token of having attended the checking and weighment. The escorts will then be relieved.

One of the invoices received through the escort is despatched to the Forest Depot Keeper through the Range Officer, and one is filed in the Final cleaning depot. The details of receipts are immediately entered in to the Final cleaning section Form no 8.

The Forest depot Keeper, on receipt of the invoice returned through the Range Officer notes the acknowledged weight and other particulars in his Form no 9 below the original entry showing the despatch of the wood to the Final cleaning depot, and enters it in Form no 8.

The Final cleaning Depot Keeper takes any number of trees (of course serially) which he thinks he can clean in a day, from the consignment received and billets them as follows:—

(1) All roots whether big or small are severed from the trunks. Hollow, knotty or badly shaped roots which are difficult to final clean are split open or their side roots cut and numbered as per instructions in the Rules Book. The trunks also are cut into billets of 3 feet length and less, the billets being kept as clean and as straight as possible. The sawdust produced during billetting is sifted and carefully preserved.

These pieces are given for final cleaning. The disposal of the trees taken for final cleaning is shown in Form no 9 of the Final cleaning Section. After all billets have been finally cleaned, the trees are once again formed with the cleaned billets, the letter representing the Felling series, the number and the portion of the tree are stamped on each piece. For example, the third billet of the second piece of tree no 49 of Aiyur Felling Series will be marked " $A49T2_3$ ": A represents the series, 49 the number of the tree, T 2 the second piece of the trunk as billetted in the Forest depot and 3 the third billet of the second piece as billetted in the Final cleaning depot. After stamping, the mid-girth and length of each piece and the weight of Rootwood and Billetwood of each tree separately are recorded in Form III (a) At the same time the lengths of all the trunk pieces put together should be compared with the lengths given in the invoice and if there is an appreciable difference it should be explained in the remarks column of Form III (a).

At the end of each day, the shavings and chips obtained should be sorted out and weighed. The weights recorded in Form III (a) (*i e.* the weights of the finally cleaned wood) are than totalled. The total number of pieces should also be worked out. An abstract showing the number of trees taken for cleaning, the number and weight of root pieces, the number and weight of billets and the weight of chips and sawdust obtained is then prepared. The total of all the weights is then obtained and to it is added the weight of sapwood chips and other impurities obtained in cleaning. This sum total should be compared with the weight of roughwood taken. The difference will always be a deficit which will be shown as such when the totals of Forms II (a) and ΙII (a) are tallied. The results of each days final cleaning should be entered immediately as receipts in the Form no 8 of the Finally cleaned Section in the respective pages allotted for each class. These results are also entered in the remarks column of Form 9 of the Final cleaning section against the entry of disposal as the "result of Conversion.' In this manner the final cleaning of all disposals in the Finally cleaned section can be watched.

After weighing the pieces for recording in Form III (a) all the pieces are hammermarked on their sawn sections and stocked in the depot.

Generally the capacity of a waggon on the narrow guage section of the South Indian Railway in which the finally cleaned wood is transported to Tirupattur Sale depot is about 8 tons, and the maximum number of waggon loads that can be despatched safely in a consignment is only two. Hence when about 16 tons of cleaned wood are collected, arrangements are made for transporting the wood The traffic superintendent of the Podanur Section is addressed in the matter and two waggons are supplied on the specified date both at Kelamangalam Railway Station where the wood is loaded and also at Morappur Junction where the wood is to be transhipped from the narrow to the Broad guage section. Two days before the date on which the waggons are applied for the whole stock is taken out in the presence of the Range Officer and the escort usually a Forester, 2 Forest guards and a watcher. The roots and billets are then classified as big and small ones, the pieces in each class are counted and weighed. They are then packed in gunnies, all pieces containing hammer marks at both ends separately, and all pieces (small ones) having no hammer marks at either or one end separately. In the latter case the bags are sealed in the presence of the Range Officer. The chips and sawdust are also filled into gunnies, packed and the bags sealed.

Originally the cleaned wood was classified before despatch into 18 classes as shown in the Rules Book- But as the Depot Keeper at Tirupattur was never satisfied with our classification and always differed, a reclassification became necessary for almost every consignment. To avoid this extra trouble and expense, the system of classification at the consigning depot was definitely abolished.

After packing and before the consignment is despatched, 5 copies of invoice in printed forms (as per Appendix XIV of the Rules Book) are prepared and the signature of the escorts and of the depot keeper are obtained. The invoices are then countersigned by the Range Officer, after he has compared them with the figures obtained during reweighment and separately recorded by him. The bags are then loaded in carts and a yellow permit is prepared in triplicate. The triplicate copy of this permit and 3 copies of the invoice are given to the Forester in charge of the consignment one copy of the invoice with the duplicate of the way permit is despatched to the District Forest Officer and the last copy of the invoice with the counterfoil of the way permit is filed in the depot.

The quantity despatched is entered into the final cleaning Section Form No. 9 and the deficit between the weight shown in Form III (a) and the weight obtained in reweighment is brought to Form No. 8 under "Deficit account".

The escort accompanys the consignment to Tirupattur, where they hand it over to the Sale Depot keeper and get his acknowledgment. The wood is then classified into 18 classes by the Sale Depot Keeper at Tirupattur and stacked.

In about the month of December each year the annual sale takes place in the presence of the Conservator.

On receipt of the invoice having the acknowledgment of receipt at Tirupattur Sale Depot, the deficit obtained is brought to account in Form No. 8 of the Finally cleaned Section of the consigning depot.

The sapwood chips are kept safe until the District Forest Officer camps at Denkanikota when he weighs and burns the whole lot, certifying at the same time in Form No. 8 that the sapwood was burnt under his supervision after the necessary check.

At the end of the month, a copy of Form III (a) of the trees cleaned during the month, the third copy of the invoice recevied from the Forest Depot and the acknowledged copy of the invoice received from Tirupattur should be submitted to the District Forest Officer with the month's Form 10 return.

The Marathon Race 1923.

——:o:——

This Race is one of the important events during the College year, in which both the Divisions take part. It is generally held during the combined camp of the Division. This year there was no opportunity for a joint camp and so the race was run at Head quarters.

The race this year came off on the 21st February. Students manifested great zeal and keenness in the contest and speculated on the possible winner.

The course covered a distance of 6 miles and 1 furlong. The whole distance lay around the College Estate along the Cowley Brown Road starting in front of the Hostel Block No. 1 along the Thadagam Road, Lodge Road and Mettupalayam Road and back again thus two complete laps had to be made finishing in front of the principal's Bangalow in the 3rd round. The course was along the open road, devoid of ups and downs, yet it was by no means easy as it lay on a hard metalled road.

The start for the race was given by the principal at 7-30 A.M. Mr. Krishnan and Mr. A. R. Brand rode to their respective obligatory points to issue chits to the competitors. The winning post was watched by Messrs C. C. Wilson, G. C. Robinson and W. C. Hart.

The prize winners in order were:—

(1)	Madhavan Nair	(Sonior Division)	Time	38 min.	0 sec.
(2)	Patras Kandir	,,	,,	39 ,,	30 ,,
(3)	N. S. Ayyanna	,,	.,	40 ,,	25 ,,
(4)	Divulveva of the	(Junior Division)	,,	43 ,,	30 ,,

The one striking feature of this race is, that all the winners are from the Senior Division and this is in a great measure due to the improvement in their physique as a result of training received in the Madras Forest College during these past 18 months and more. This fact is doubly proved when we see the Senior Division won Inter-division cup by 104 points to 276. It will not be out of place to mention here that the present Senior Division lost the cup last year to their Seniors, and let us hope that the same may be in store for our present juniors.

Snap-shots were taken as the winners approached the goal. The arrival of the last man was watched for with as much excitement as the first runner.

The Principal and Mrs. Wilson entertained the students with light refreshments and a cool drink of limejuice which every one fully appreciated and felt thankful for, after a hard run.

Mr. G. C. Robinson, the Vice-President, in a few words congratulated the winners and Mrs. Wilson kindly gave away the prizes. The first prize was a silver cup presented by K. Rama Raja Mannarghat Moopil Nair, for the first time and it was won by P. Madhavan Nair, the winner of many Athletic Honours during this year. The second and third men were given good prizes and the challenge cup was taken for the Senior Division by K. Sankara Narayana Rao.

With three cheers to Mr. and Mrs. Wilson, this delightful function came to a close.

S. DORARAJA,
Athletic Secretary,
Madras Forest College.

21-2-23
Coimbatore

Miscellanea.

I. A Mimicking Plant.

A correspondent wires from Coimbatore under date December 5: A pumpkin plant in the country house of Mr T. Krishna Chetty, cotton prince in Ramanathapuram, which is in the outskirts of this town, is an object of considerable curiosity and attraction to thousands of people from every part of the district. A slender branch of this plant has, by a strange freak * of nature, abruptly taken the shape and size of a tolerably big serpant and flattened at the end to represent a five headed cobra with its hoods drawn up. Underneath the five hoods and heads are tiny flowers representing the tongues put out. People say that there is some religious significance in this strange phenomenon, but no one is able to say what it is The superstitious among them say it is nothing short of Sesha Avathar. Daily Puja is performed at the spot with milk and camphor. The stream of visitors who go to see this sight reminds one of devotees going to a place of pilgrimage.—Extracted from "The Hindu" dated 7-12-22. S. Rangasamy.

PRICKLY PEARS

Power Alcohol Production.

The "Times Trade Supplement writes:—During the period of fuel scarcity which began during the war and lasted for some time after hostilities ceased much attention was devoted to the problem of finding substitutes for coal and mineral oil Power alcohol distilled

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*(This is a case of "fasciation" Ed.)

from vegetable products was regarded hopefully as a possible solution and the British Fuel Research Board made elaborate investigations as to available sources of raw material suitable for use as a base for the manufacture of power alcohol. The Board's conclusions were somewhat pessimistic, and with the return of normal conditions resulting in ample supplies of coal and oil fuel the need for an efficient substitute became less urgent. Yet, as farsighted men realise, the crisis has been postponed rather than permanently removed, and, in view of the steady progress towards exhaustion of the world's mineral fuel supplies the search for a non-exhaustible source of energy is, a matter which we connot afford to abandon: It was thought at one time that cultivated crops such as potatoes and maize could be used successfully as raw material for the distillation of fuel alcohol. Expert examination showed, however, that there were apparentive insuperable economic difficulties owing to the cost of land, labour, and transport. Further, although alcohol fuels derived from maize have been put on the market in South Africa, it is very doubtful whether their production from this base can be regarded as a commercially profitable operation, in view of the fact that maize and its by-products have a higher value as food-stuffs than that of the fuel which can be derived from this source. These considerations resulted in the general conclusion that it is only in the tropics, where there is a profuse and rapidly replaced growth of self-propagated vegetation, that the production of fuel alcohol on a scale commensurate with the eventual needs of the world, is a practical possibility. The fact that the type of power alcohol known as Natalite is being successfully manufactured from the molasses which are a by-product of sugar factories must be regarded as an exception to the general conclusion that cultivated crops cannot be considered as economically possible raw materials for power alochol production. The supply of molasses, even if the total sugar crop of the world is taken into account would, however, provide only a fraction of the power alcohol that will be needed when the world's petroleum sources begin to fail.

In these circumstances great interest attaches itself to the article from our Bloemfounten Correspondent South Africa is entitled to the credit for the invention and commercial utilization of Natalite, and it would seem that the Union has to be congratulated on a further and perhaps still more important step in the same direction. Some 2,000,000 acres of land in South Africa are infested with prickly pear, a vegetable pest which not only renders land on which it has obtained a footing useless for all other purposes, but spreads with great rapidity. There is reason to believe that on Orange Free State farmer has succeeded in turning the prickly pear to commercial account by utilising it as a base for power alchohol production. It is claimed that the motor spirit obtained from this source is at least equal to the highest grades of imported petrol, and trials are reported to have been very satisfactory. An annual production of 350,000,000 gallons, which would be nearly thirty times the present consumption of motor spirit by the Union is estimated as possible, and is stated that the new spirit could be retailed at 2sh. per gallon. Further developments will be watched with deep interest, particularly in Australia, where something like 22,000,000 acres in Queensland and New South Wales are infested with prickly pear which spreads at the rate of 40,00,000 acres a year. Much time and money have been expended in the Commonwealth in the endeavour to find a satisfactory method of eradicating this pest and if it is shown by South African experience that it can be successfully used for power alchohol production Australians will doubtless hasten to follow suit. A point to which our correspondent draws attention is the opportunity presented to British motor engineers to design a special type of high-compression internal combustion engine for use with pure alcohol. He holds out the inducement that the British firm which produces such an engine will have a fair prospect of recapturing the markets of South Africa, Australia, and India at a stroke, for the reason that all the existing American cars, which now dominate these markets are designed for use with petrol, of which the price is too high to permit any rapid expansion of the use of motor-cars. British motor manufactures will, therefore, be well advised to keep themselves fully informed as to development in this direction:—

Contributions to the Gass Forest Museum.

Serial No.	Contribution.	Contributor.
1.	One long panel of *Cullenia excelsa*	Captain H. A Irwin, M.C., Forest Exploitation Officer.
2.	Six short panels, Eight bark samples, Eight twigs, and Seven seedlings of evergreen species	F. R. Madan Fsq., I. F. S., District Forest Officerr South Mangalore.
3.	One long panel and two blocks of *Michelia champaca*.	M. R. Ry. B. S. Ramasami Ayyar Range Officer, Kollegal.
4.	Three panels of *Chickrassia tabularis*,	Mr. B. R. Salisbury Range Officer Kodamady.
5.	Sample of green dammar	C. Napier Fsq., Castlecroft Estate Valparai

6.	Eleven (rough) specimens of 3-ply wood made in the New Malabar Timber yards and Saw mills Ltd. Kallai	Bracebrookes Esq.,
7.	Thirteen short panels, Thirteen bark pieces, Five Seedlings and Four fruits	M. R. Ry- K. Ragavan Range Officer Kannoth
8.	Two bark samples of *Michelia Chempaca*	M. R. Ry. M. Rama Rao Kini Range Office. Kollegal.

Additions to the Madras Forest College Library.

1. Memoirs of the Indian Museum Vol. V. Fauna of the Chilka Lake, No. 10, Aug. 1922.
2. Report of the Forest Department (Western Australia) for the year ending 30th June 1922.
3. Flora of the Nilghiri and Pulney Hill tops—*by, P. F. Fyson* M. A., F L. S., Vols I, II, and III.
4. Census of India, 1921 Vol XIII Madras Parts I to III.
5. A manual of Indian Timbers (Revised edition)-*by J. S. Gamble*, M. A., C. I. E., F. R. S., F. L. S.
6. Administration report of His Exalted Highness, the Nizam's dominions, for the year 1330 Fasli (6-10-1920 to 5-10-21)
7. Forest Administration of the Central Provinces for the year 1920 –21.

8. Annual return of statistics relating to Forest Administration in British India for the year 1920—21.

9. Report on Forest administration in the Andamans for the year 1920--21.

10. The Indian Forest Records Vol. IX, Part III — *by, M. Gopal Rao and J. L. Simonsen.*

11. Memoirs of the Indian Museum, Vol. VII No. 4.

12. Administration report of the Forest Department of the Madras Presidency for the year ending 31-3-22 (1921—22)

13. Forest bulletin No. 49, 1922,...Note on Thingan—*by, Rodger* O. B. E., F. L. S.

14. Forest bulletin No 50, 1922 Note on Gurjan—*by, W. A. Robertson* I. F. S.

15. Report on Public Instruction in the Madras Presidency for 1920—21 Vols. I & II.

16. Sample plot calculations—*by, S. Howard* B. A., I F, S.

17. Progress report of the Imperial Forest College, Dehra Dun for the year 1921—22.

18. Methods of preparing volume and money yield tables for teak woods etc., from data collected in the Nilambur Teak Plantations—*by, R. S. Bourne Esq* M. A., I. F S. (1916-19)

19. Twenty nine copies of the "*Indian Scientific Agriculturist*', —*presented by, Mr. B. R. Salisbury.*

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The Principal, Madras Forest College acknowledges with thanks receipt of the following donations, promised by ex-students of the College and paid during December 1922 to February 1923.

Name of ex-student.	*Amount Paid.*
M. R. Ry. C. S. Ramanatha Ayyar	Rs. 5 14 0
„ M. R Doraisami Ayyar	Rs. 3 0 0
Md. Gulam Dastagir Sahib	Rs. 9 0 0
Mr. S. A. Dawson	Rs. 11 0 0
Md. S. V. Sigbatullahi Sahib	Rs. 5 0 0

* * * * * *

Statement showing amount promised and still due by ex-students of the Madras Forest College, towards the Students' Club:—

	Rs.	A.	P.
M. R. Ry C. S. Ramanatha Ayyar	5	0	0
Md. S. V. Sigbatullahi Sahib	5	0	0
M. R. Ry. W. Balakrishna Mudaliar	10	0	0
R. E. Lemos Esq., E. A. C.	50	0	0

Gazette Notifications.

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7—11—1922.

M. R. Ry. K. Gajaraja Mudaliyar Avergal, Extra Assistant Conservator of Forests, leave on average pay for four months with effect from date of relief.

Mr. R. D. Richmond, Deputy Conservator of Forests, on return from leave, to act as Conservator of Forests, Sixth Circle.

14—11—1922.

Mr. H. Tireman, Conservator of Forests, Sixth Circle, leave on average pay for four months from 11th November 1922, in lieu of the leave already granted to him. He is also granted an extension of leave for three days on half average pay.

21—11—1922.

Mr. M. C. Chandy, an extension of leave for one month on average pay and for seven days on half average pay in continuation of the leave already granted to him.

28—11—1922.

Mr. F. R. Madan, District Forest Officer, South Mangalore is granted leave on average pay for 3 weeks from 3rd January 1923, with permission to affix the ensuing Christmas and New year holidays to his leave provided the conditions laid down in the subsidiary rules under Fundamental Rule 68, in G. O. No. 944 Finance, dated 6th November 1922 are fulfilled. (The District Forest Officer N. Mangalore will be in additional charge of the division during the absence of Mr. F. R. Madan on leave).

5—12—1922.

The following promotion of a Forest Officer is ordered:—Mr. R. B. Cornwell, Extra Assistant Conservator of Forests, to the Imperial Forest Service, Vice Mr. A. B. Myer retired.

Mr. B. K. Roy, Assistant Conservator of Forests, is granted leave on average pay for eight days from 22nd to 29th October 1922, in continuation of the one month's leave already granted.

12—12—1922.

Mr. M. F. Bridge, Assistant Conservator of Forests, is granted leave on average pay for 12 days from 11th December to 22nd December 1922 inclusive, with permission to affix the ensuing Christmas and New Year holidays.

19—12—1922.

Mr. T. V. Venkateshwara Ayyar Avergal, Extra Assistant Conservator and acting District Forest Officer, Kurnool East on relief by M. R. Ry. M. C. Chandy Avergal, will be attached to the same division as Assistant to the District Forest Officer.

M. R. Ry. P. Govinda Menon Avergal, Extra Assistant Consevator of Forests, on return form leave is posted to work under the orders of the District Forest officer, Nilambur, and carry out the annual thinnings under District Forest Officer's instructions.

Saiyid Riasuddin Sahib Bahadur, Extra Assistant Conservator of Forests, leave on average pay for 10 days from 13th December with permission to affix the Christmas and New year holidays.

M. R. Ry. S. Ramaswami Ayyar, Extra Assistant Conservator, Guntur, is posted to the charge of Kurnool West Division, during the absence of Mr. E. M. Grothers on leave for one month from 3rd January 1923. To join on the afternoon of 22nd December 1922.

2—1—1923.

In modification of the order dated 13th December 1922, Saiyid Riasuddin Sahib Badur, Extra Assistant Conservator of Forests, is granted leave on average pay for ten days from 3rd January 1923 with permission to prefix the Christmas and New Year holidays.

9—1—1923.

Mr. W. H. Woodhouse Adolphus, Extra Assistant Conservator oJ Forests leave on average pay for four months from or after 1st February 1923. Mr. M. C. Chandy, Extra Assistant Conservator of Forests, an extension of leave on half average pay till 31st May 1923 in continuation of the leave already granted to him.

16—1—1923.

Mr. H. A. Latham, Conservator of Forests, leave for nine months (eight months on average pay and one month on half average pay) from or after 5th February 1923.

The following officers appointed to the Indian Forest Service by the Secretary of state reported their arrival at Bombay on the fore-noon of the 11th December 1922. Mr. H. G. Hicks, Mr. R. S. Browne, Mr. I. A. Wilson, Mr. J. E. M. Mitchell and Mr. P. W. Davis.

The following promotions and postings are ordered:—Mr. T. A. Whitehead, Deputy Conservator of Forests and District Forest Officer, Nilgiris, to act as Conservator of Forests, Sixth Circle Vice Mr. R. D. Richmond on other duty. Mr. J. W. K. Wernham, Assistant Conservator of Forests, to be District Forest Officer, Nilgiris Vice Mr. T. A. Whitehead.

His Excellency the Viceroy and Governor-General is pleased to confer the title of "RAO SAHIB" as a personal distinction, upon M. R. Ry. Aaron Appadurai Pillai Avergal, M. A. Deputy Collector, Madras Presidency.

23—1—1923.

Mr. O. H. C. Shelswell, Deputy Conservator of Forests, on return from leave to work under the District Ferest Officer, Ganjam. Mr. F. R. Madan, Deputy Conservator of Forests, is granted extension of leave on average pay for six days in continuation of the leave for three weeks granted in Chief Conservator's Proceedings No. 1443-Rt./ dated 20th November 1922 subject to the certificate of eligibility from the Accountant General. (The District Forest Officer, North Mangalore will continue to be in additional charge of the division during this period.)

30—1—1923.

Mr. A. Wimbush, Deputy Convervator of Forests, to act as Conservator of Forests, *vice* Mr. H. A. Latham granted leave.

Mr. J. H. Longrigg, District Forest Officer Lower Godavari to be District Forest Officer, Ganjam *vice* Mr. A. Wimbush on other duty.

Mr. C. J. Van Hæfton, extra Assistant Conservator of Forests, to be District Forest Officer Lower Godavari *vice* Mr. J. H. Longrigg.

Mr. J. A. Master, Deputy Conservator of Forests, and District Forest Officer, South Cuddapah, to be District Forest Officer Wynaad *vice* Mr. Woodhouse Adolphus granted leave.

Mr. B. K. Roy, Assistant Conservator of Forests, to be District Forest Officer, South Cuddapah *vice* Mr. J. A. Master.

Notifications relating to Range Officers.

First Circle.

9—11—1922.

1. H. P. Ward Esqr., Assistant Conservator of Forests to be in charge of Russellkonda Range from 2-11-1922.
Ranger Bhagirathi on relief by Mr. Ward to work under the latter's orders in Russellkonda Range.
Service order No. 232 of 22 dated 24-10 1922 bv the District Forest Officer, Ganjam is cancelled.

11--11--1922.

2. On return from leave, Ranger M. R. Ry. V. S. Subrahmanya Iyer, is posted to Palakonda Range of the Vizagapatam District to relieve Ranger M. R. Ry. A. R. Pingale. The latter will Assistant Ranger V. S. Subrahmanya Iyer until further orders.

29—11--1922.

3. M. R. Ry. V. S. Subrahmanya Ayyar, Ranger II grade. Parlakimidi Maliahs, is granted an extension of leave on average pay for four months from the date of expiry of the leave already granted in the Agency Commissioner's D. Dis. No. 3808/22 G-1 of 1st July 1922 and D. Dis. No. 5629/22 G-1 dated 21st September 1922.

18--12--1922.

4. M. R. Ry. A. Tirupatirayudu, supernumerary Ranger is transferred from Lower Godavary to Parlakimidi Maliahs for the charge of the Mahendra Range: He should report himself to the Special Forest Officer on 15-1-1923.

22—1--1923.

5. Under Rule 81 of the Fundamental rule M. Subba Rao, Forest Ranger VI grade, Godavari Upper, is granted leave on average salary for one month with effect from or after 28th January 1923.

* * * * * *

Second Circle.

14—11—1922.

6. Syed Ibrahim Albeiz Sahib, Ranger III grade is granted an extension of leave not due, on half average pay, on Medical Certificate under rule 81 (c) of the Fundamental rules for one month in continuation of the leave already granted in this office S. O. No. 82 of 22 dated 12-10-1922.

15—11--1922.

7. M. R. Ry. G. Rama Rao Ranger IV grade posted in this office S. O. No. 85/22 dated 21-10-22 to Gundlabrahmeswaram range Kurnool West, is granted an extension of leave for 3 months in continuation of the leave already granted in this office S. O. No. 70/22 dated 29-8-22 as follows:—

Leave on Medical Certificate (1) on full average pay for 2 months and 4 days (2) on half average pay for 26 days.

23--11--1922.

8. M. R. Ry. A. Vyasalu, Ranger VII grade is granted an extension of leave on average pay for two months on Medical Certificate in continuation of the leave already granted in this office S. O. Nos. 54 and 81 of 22 dated 6-7-22 and 11-10-22 respectively.

2—12—1922.

9. M. R. Ry. A. Bhavaiah, Ranger VI Grade is granted an extension of leave on average pay for one month in continuation of the leave already granted in this office S. O. No. 94/22 dated 9th November 1922.

7—12—1922.

10. (1) Ranger M. Krishna Rao IV Grade on special duty in Bellary District is transferred to Kadiri Range Anantapur District. He should relieve at once Supernumerary Ranger T. M. Krishnamachary. This cancels the posting of Ranger B. V. Jogeswara Rao to Kadiri ordered in this office S. O. No. 88/22 dated 30-10-22.

(2) Ranger B. V. Jogeswara Rao V Grade is granted an extension of leave on Medical Certificate for 6 months in continuation of the leave already granted for 6 months from 25-5-22.

14-12-1922.

11. Ranger I. John VII Grade under suspension, attached to the II Circle is dismissed from service with effect from 11-12-22, Vide II Circle Conservator's proceedings dated 11-12-22 on the charge sheet framed against him by the District Forest Officer, Kurnool East.

18—12—1922.

12. Ranger Syed Ibrahim Albeiz III Grade is granted an extension of leave *not due* on half average pay on Medical Certificate under rule 81 (c) of the Fundamental rules for one month from 6-12-22 in continuation of the leave already granted in this office S. O. No. 96 of 22 dated 14-11-'22.

8—1—1923.

13. M. R. Ry. T. K. Ramaswamy Iyer, Ranger II Grade is granted an extension of leave for two months on average pay on Medical Certificate in continuation of the leave already granted in this office S. O. No. 93/22 dated 6-11-'22.

19—1—1923.

14. Ranger Syed Ibrahim Albeiz III Grade is granted an extension of leave *not due* on half average pay on Medical Certificate under rule 81 (c) of the Fundamental rules for one month from 6-1-23 in continuation of the leave already granted in this office S. O. No. 108 of 22 dated 18-12-'22

19—1—1923.

15. Ranger M. Hussain Khan II Grade is granted an extension of leave for 6 weeks on half average pay in continuation of the leave granted in S. O. No. 83/22 dated 17-10-1922.

26—1—1923.

16. (1) Ranger B. Punniah IV Grade; Owk Range, Kurnool South Division is granted leave on average pay for 3 months from date of relief.

(2) Ranger, G. Rama Rao IV Grade on return from leave on 12-2-23 is posted to Owk Range to relieve No. 1 or until further orders.

(This cancels his posting to Gundlabrahmeswaram Range.)

27—1—1923.

17. Supernumerary Ranger, V. N. Subramania Ayyar in charge of Sirvel Range, Kurnool South Division on relief by Ranger, A. Vyasalu on 18-1-23 is transferred to Kurnool East Division to work under the orders of the District Forest Officer Kurnool East. To join at once.

* * * * * *

Third Circle.

14-11-1922.

18. M. R. Ry. S. Vasudeva Reddy, Ranger, I Grade incharge of Odugathur Range, North Vellore, is granted 4 months leave (privilege leave for 3 months' and 2 days and leave on average pay for the remaining period) with effect from date of relief.

(2) M. R. Ry. K. Raghuraman, acting Ranger, VII grade on Special duty, North Cuddapah District is posted to Odugathur Range charge to relieve No. (1) before the 25th November 1922.

15-11-1922.

19. (1) Mr. E. W. Fernandez, Ranger, V Grade on special duty, South Cuddapah District is posted to the charge of Kodur Ranger of the same district,-to join forthwith.

(2) M. R. Ry. K. M. Gopalachari, Ranger, III Grade, Subprotem in charge of Kodur Range, South Cuddapah District, on relief by No. (1) is posted to the charge of Palamaner Range, Chittoor District,—to join without availing full joining time.

(3) M. R. Ry., T. M. Doraiswami Pillai, Ranger, V Grade, on relief by No. (2) is ordered to remain attached to Palamaner Range, Chittoor District until relief to join the Vernacular Training School, 1923, in January 1923.

16-11-1922.

20. M. R. Ry. N. Rajagopaul Chetty Probationary Ranger on special duty West Cuddapah District is transferred to North Cuddapah District for general duty under the orders of the District Forest Officer. He may be employed on the Early burning operations.

20-11-1922.

21. M. R. Ry. D. Krishnaswamiah Supernumerary Ranger in charge of Sanipaya Range, West Cuddapah District on Relief by M. R. Ry. B. Chenchuram Naidu, Ranger IV Grade, on return from leave, is granted privilege leave for one month and 24 days with effect from 1st December 1922.

1-12-1922.

22. M. R. Ry. T. M. Duraiswami Pillai, Ranger, V Grade, in charge of Palamaner Range, Chittoor District, is on relief of the Range charge granted privelege leave till 7th January 1923 and directed to report himself before

the District Forest Officer, North Cuddapah, on 15th January 1923 to take up the duties of the Senior Instructor Vernacular Training School 1923 Session.

7-12-1922.

23. In modification of this office S. O. No. 90/22 M. R. Ry. T. M. Duraiswami Pillai, Ranger, V Grade, in charge of Palamaner Range, Chittoor District is on relief of the Range charge to remain attached to the Range for a period of 1 week is thereafter granted privelege leave till 12th January 1923 and directed to report himself before the District Forest Officer North Cuddapah *20th January 1923* to take up the duties of the Senior Instructor Vernacular Training School 1923 session.

7-12-1922.

24. M. R. Ry. N. Rajagopal Chetty, Pro. Ranger, is granted one month's leave on average salary on medical certificate from 2-12-1922.

10-12-1922.

25. The one month's extension of leave granted to M. R. Ry. B. Chenchurama Nayudu, Ranger, IV Grade, West Cuddapah District, in this Office S. O. No. 89 of 22 dated 30-11-1922 will be treated as leave on average pay on Medical Certificate for one month.

30-11-1922.

26. M. R. Ry. B. Chenchu Rama Nayudu, Ranger IV Grade West Cuddapah District is granted an extension of leave on Medical Certificate for 1 month from 17-11-22 in continuation of the 2 months' privilege leave granted to him in this Office S. O. No. 61 of 22, dated 4-9-1922

15-1-1923.

27. M. R. Ry. C. R. Rajagopala Ayyangar Ranger VI Grade on special duty Mamandur Range, Chittoor District is posted to the charge of Gudiyatham Range, North Vellore District to join *at once* to relieve the Ranger who has fallen sick.

(2) M. R. Ry. A. Ranganayakalu Nayadu Ranger II Grade sub-protem in charge of Gudiyatham Range North Vellore District on relief by No. (1) is granted leave-the particulars of which will be notified after receipt of the District Forest Officer's final report.

25-1-1923.

28. M. R. Ry. S. Ramachandra Ayyar Ranger III Grade from the Chandragiri to the Mamandur Range of Chittoor District. To join without availing himself of extra joining time after being relieved by No. (2).

(2) M. R. Ry. D. Venkateswaralu Ranger V Grade from Chamala to Chandragiri Range of the same district. He should releive No. (1) on or before the 31st instant. He will continue to hold charge of the Chamala Range till relieved by No. (3).

(3) M. R. Ry. V. Narayana Menon Ranger V Grade from the Mamandur to Chamala with head quarters at Bhakarapet. He must join the Chamala Range and relieve No. (2) without delay as soon as he is relieved by No. (1).

25-1-1923.

29. In supercession of this Office S. O. Nos. 11 of 22, dated 2-2-1922, 25 of 22 dated 23-4-1922, and 37/22 dated 10-6-1922, Mr. E. W. Fernandez, Ranger, V Grade, is granted furlough on full pay for 5 months from 1-12-21 and furlough on half pay for 1 month and 18 days in continuation thereof.

This cancels para 2 of this office No. 2807/1922 dated 18-11-1922 treating the period of suspension for 1 month as counting towards pension.

25-1-1923.

30. M. R. Ry. P. Gopalam, Supernumerary Ranger in charge of Morricheruvu Range, Kurnool East on relief of the Range Charge is posted as Junior Instructor Vernacular Training School 1923 session at Cuddapah.
This cancels the appointment of Probationary Ranger D. Krishnaswamiah ordered in this office S. O. No. 70/22 dated 5th November 1922.

29-1-1923.

31. In partial modification of this office S. O. No, 83/22 dated 30-11-22 M. R. Ry. D. Krishnaswamiah Supernumerary Ranger, West Cuddapah District is granted leave on average pay on Medical Certificate for 4 months with effect from date of relief of Sanipaya Range charge of the West Cuddapah District.

7-2-1923.

32. In partial modification of para 2 of this Office S. O. No. 5 of 23 dated 15-1-23 M. R. Ry. A. Ranganayakulu Naidu, Ranger II Grade Sub protem in charge of Gudiyatham Range North Vellore District is granted leave on average pay for one month with effect from 4-2-23 the date of relief of the Range charge.

Fourth Circle.

18—11—122.

33. M. R. Ry. L. R. Narayana Ayyar, Ranger II Grade *sub pro tem,* East Salem Division is reduced two Grades and this will put him into the IV Grade.

The Ranger will be under suspensien from 16-9-1922 till he rejoins West Vellore Division.

21—11—1922.

34. M. R. Ry. R. Subramania Ayyar, Ranger III Grade, is granted extension of leave for 6 months (on half average salary for 3 months and 20 days under rule 81 (b) (ii), and for 2 months and 10 days under rule 81 (c) (i) of the Fundamental Rules) from 7-10-1922.

23—11—1922.

35. M. R. Ry. S. Ramalingam Ayyar, Supernumerary Ranger on return from leave on 1-12-1922 is transferred to North Salem Division for the charge of Anchetti Range.

Ranger S. M. Srinivasagam Pillai is transferred to special duty in South Vellore.

29—11—1922.

36. M. R. Ry. P. A. Krishnaswami Mudaliar, Ranger V Grade in charge of Chitteri Range, is granted leave on average salary for 3 months from 28-10-1922.

M. R. Ry. P. Sithapathi Ayyar, Supernumerary Ranger, is posted to the charge of Chitteri Range from the afternoon of 3-11-1922.

2—12—1922.

37. M. R. Ry. J. M. Abraham, Ranger IV Grade, in charge of Cauveri Range Central Salem Division, is granted leave for two years (on average salary for 4 months and and half average salary for 1 year 8 months) from date of relief, preparatory to retirement.

3—12—1922.

38. M. R. Ry. T. Perumal, Supernumerary Ranger on special duty, South Salem Division. is posted to the charge of Cauveri Range, Central Salem Division *vice* M. R. Ry. J. M. Abraham, Ranger IV Grade granted leave. To relieve the latter as soon as possible.

7—12—1922.

39. M. R. Ry. V. D. Ramalingam, Ranger VI Grade on special duty, South Salem Division, will be in charge of Namakal Range during the absence of Mr. M. F. Bridge, Assistant Conservatcr of Forests, granted leave for 12 days from 11-12-1922 to 22-12-1922 with permission to avail of Christmas and New Year Holidays.

10—12—1922.

40. (1) Syed Yahia Sahib, Ranger V Grade, *sub pro tem* in charge of Salem Range, Central Salem Division, is granted leave on average salary for 4 months from 3-1-1923 with permission to prefix Christmas and New Year Holidays.

2. M. R. Ry. K. Parthasarathi Ayyangar, Ranger VI Grade, on special duty, West Vellore Division, is posted to the charge of Salem Range.

He should relieve No. 1 on the *afternoon* of 22-12-1922.

15—12--1922.

41. (1) M. R. Ry. T. D. Rajabahadur Mudaliar, Ranger VI Grade on special duty, Central Salem Division, is posted to the charge of Anchetti Range North Salem Division. To join expeditiously.

2. M. R. Ry. S. M. Srinivasagam Pillai, Ranger V Grade *sub pro tem* in charge of Anchetti Range, North Salem Division, on relief by No. 1 is posted to Central Salem Division for special duty.

2—1—1923.

42. Ranger S. G. Venkataramanan, V Grade, *sub pro tem* in charge of Denkanikota Range, North Salem Division, is appointed as Instructor, Vernacular Training School to be held in the same Division during the session 1923.

2. Supernumerary Ranger T. Perumal Gounden, South Salem Division is appointed as Assistant Instructor, Vernacular Training School to be held in North Salem Division during the Session 1923.

3. Ranger T. D. Ponniah, V Grade on leave is posted to the charge of Denkanikota Range-Vice No. 1.

5--1—1923.

43. This Office Service Order No. 160, dated 3-12-1922 posting Supernumerary Ranger T. Perumal to charge of Cauvery Range, Central Salem Division, is cancelled.

M. R. Ry. S. M. Srinivasagam Pillai, Ranger V *sub pro tem* posted to special duty Central Salem Division, in Service Order No. 167, dated 15-12-1922, is now posted to the charge of Cauveri Range of the same Division.

5—1—1923.

44. Supernumerary Ranger S. Ramalingam Ayyar, North Salem Division, on return from leave, is posted to South Salem Division, for special duty.

2. Ranger S. Ramanujam Sesha, VI Grade, Central Salem Division, on return from leave, is posted to the same Division for special duty.

16—1—1923.

45. M. R. Ry. R. Manickam, Ranger III Grade, North Salem Division, is reduced to the next lowest grade from 16-1-1923 for two months.

17—1—1923.

46. Ranger L. R. Narayana Ayyar, IV Grade, is suspended for absence from duty from 19-12-1922 without leave and for not leaving his address with the District Forest Officer, West Vellore.
His explanation is awaited for not reporting to the District Forest Officer in Tirupatur and getting orders.

18—1—1923.

47. Ranger Syed Munvar Sahib, V Grade, West Vellore Division, is reduced in his Grade (V) and rank below Ranger V. Narayanasawmi Ayyar.

19—1—1923.

48. Ranger P. A. Krishnaswami Mudaliar, V Grade, East Salem Division, after production of Medical Certificate fitness to return to duty from leave, is posted to the charge of Polur Range.

2. Supernumerary Ranger M. S. Krishnaswami Ayyar on relief by No. 1 is posted for special duty in the same Division.

25—1—1923.

Supernumerary Ranger, S. Ramalingam Ayyar, is granted extension of leave on half average salary from 1-12-1922 to 2-1-1923 both days inclusive.

Fifth Circle

15—12—1922.

50. Mr. L. J. Taylor, Ranger II grade S. P. T. in charge of Kannikatti Range, is granted two months leave on average pay from 3rd January 1923 with permission to avail of the Christmas holidays.

29—12—1922.

51. M. R. Ry. S. M. Krishnaswami Ayyar Ranger, IV grade, is posted to temporary charge of Kannikatty Range, Tinnevelly District from 23rd December 1922 vide Mr. L. J. Taylor on leave.

14—1—1923.

52. M. R. Ry. A. M. Srinivasalu Naidu Ranger VI grade Tinnevelly District is granted, under Rule 81 (b) (ii) of the Fundamental rules-leave on average pay from 17th September to 1st December last (inclusive) in continuation of the one month's leave on average pay granted to him by the D. F. O. Tinnevelly from 17th August last.

Sixth Circle

16—11—1922.

53. M. R. Ry. K. Appiah, Ranger, VI grade, is transferred from the Nilgiris Divison to Nilambur for special duty.

16—1—1923.

54. M. R. Ry. E. Sambamurthi Ayyar, Ranger V grade is on the expiry of the leave granted him, posted to the Palghat Division for work on regeneration

Advertisements.

The following is a list of specimens required for the Gass Forest Museum. The Principal will be grateful to officers who can procure such of them as are available in their division The long panels should be approximately 5 feet long, 3 inch thick and as broad as available; the blocks 1 foot × 9 inch × 3 inch and the bark pieces about 6 inch square.

Species		Long panel required	Short panel required	Block required	Bark pieces required
Aglaia Roxburghiana	...	1	1	1	1
Aquilaria Agallocha	...	1	1	1	1
Albizzia procera	...	1	0	0	1
Acacia dealbatta	...	1	1	1	1
Acrocarpus fraxinifolius	...	1	0	0	1
Chickrassia tabularis	...	1	1	1	1
Dillenia indica	...	1	0	1	1
Diospyros tomentosa	...	1	1	1	1
Diospyros paniculata	...	1	1	1	1
Diospyros Ebenum	...	0	1	0	0
Dalbergia sissoo	...	1	1	1	1
Erythroxylon monogynum		1	1	1	1
Gmelina arborea	...	0	1	0	1
Grewia asiatica	...	0	1	1	1
Holoptelia integrifolia	...	0	0	0	1
Hydnocarpus Wightiana	...	1	0	0	1
Hereteria papilio	...	0	1	1	1
Litsaea zeylanica	...	1	1	1	1
Machilus macarantha	...	0	1	1	0
Premna tomentosa	...	1	1	0	1
Sterculia foetida	...	1	1	0	1
Sterculia villosa	...	1	0	0	1
Sterculia guttata	...	1	0	0	1
Stereospermum chelonodios		1	0	0	1

The following numbers of the "Indian Forester" are required for the *Students'* Library. The Principal will be glad to receive any that officers can spare:—

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2. Volume 6 for 1880-81.
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4. Volume 15, 16 for 1889 and 1890.
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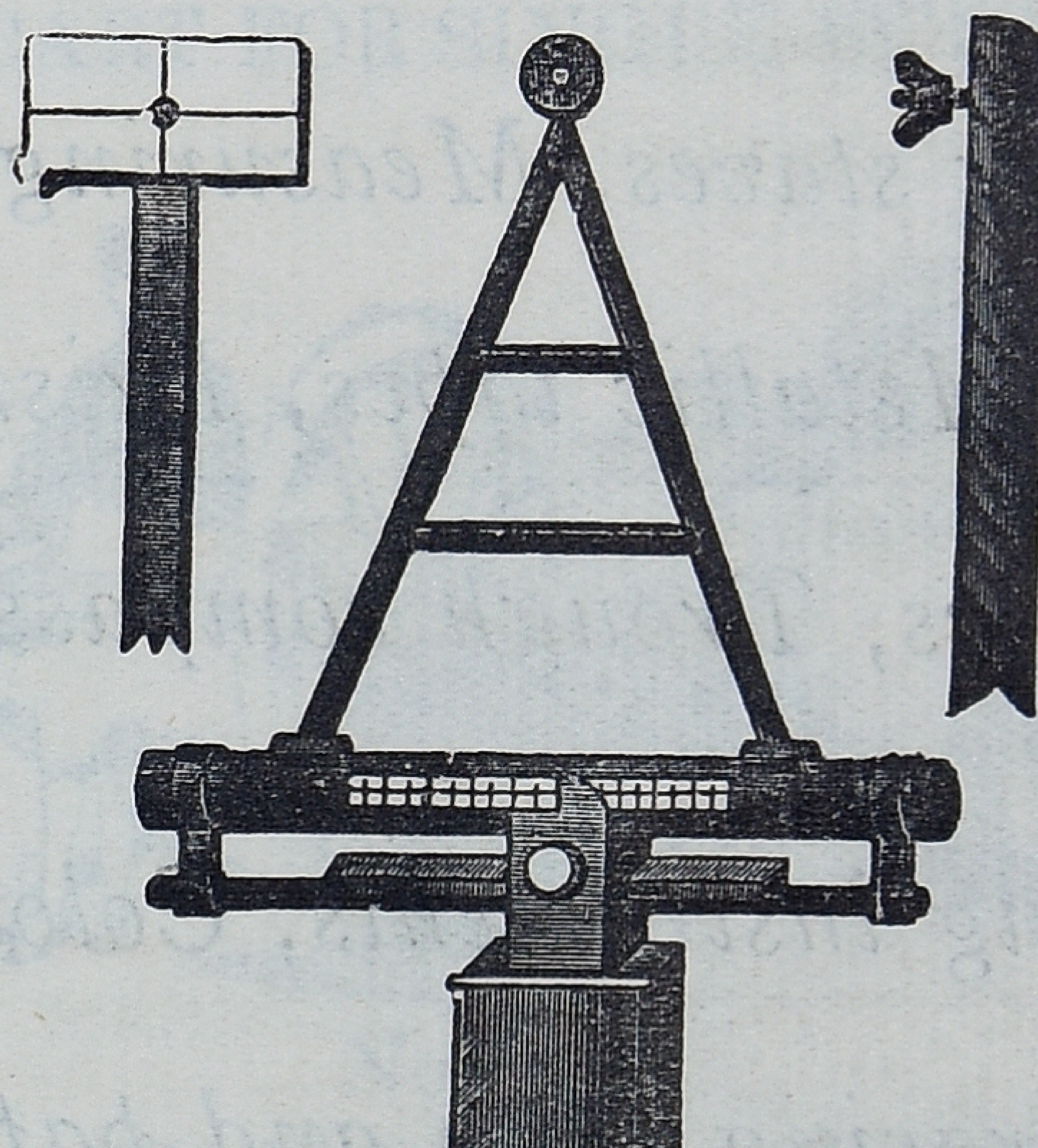

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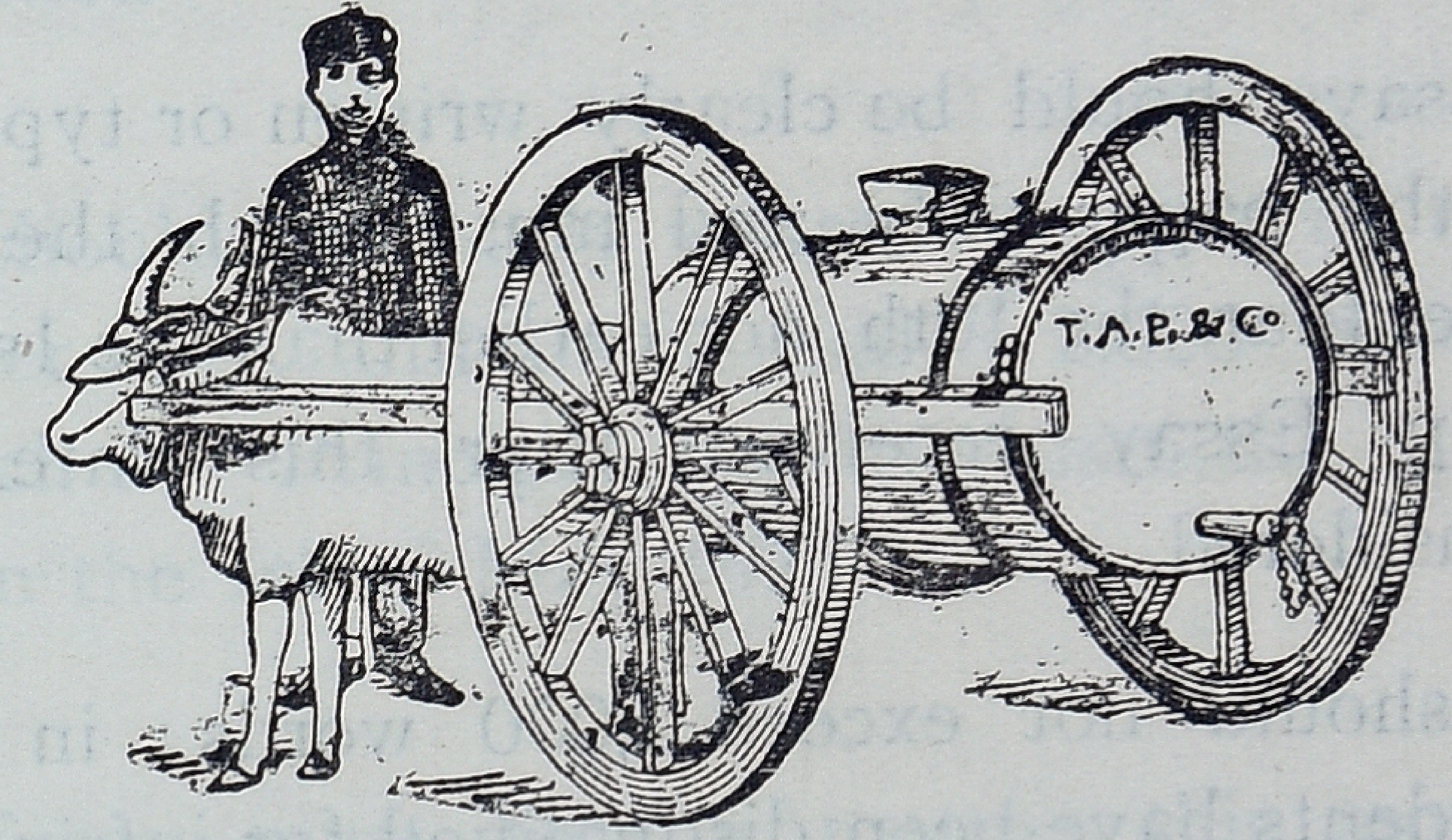

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I

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(for PRESENT Students).

The subject for the above Prize for the current year will be :—

"My favourite tree."

The Prize is open to all **PRESENT** students of the College.

A Prize for an Essay on a different subject has also been allotted for all **PAST** Madras Forest College students.

No award for either Prize will be made unless a satisfactory standard is reached.

The Essays should be clearly written or typed on one side of the paper only, and must reach the Principal not later than the 10th, nor earlier than the 1st of May 1923. Any Essay received after this date will not be considered.

Essays should not exceed 2,000 words; in previous years students have been disqualified for infringing this ruel.

Each Essay must bear a motto; this motto is also to be written on the outside of a sealed envelope inside which is a paper containing the name of the competitor; the name of the competitor must not appear on the out side of the envelope, and must not be written on the Essay. Each Essay must be the *bonafide* unaided work of the Competitor submitting it

* * * * * *

II

Indian Forester Prize 1923.

(for PAST Students)

A Prize allotted from the " Indian Forester " Fund will be awarded to the **PAST** student of the Madras Forest College who submits the best Essay, on the following subject :—

"Describe a Typical Day in a Forest Ranger's Life"

No award will be made unless a satisfactory standard is reached.

Essays should be clearly written or typed on one side of the paper only, and are limited to 2,000 words ; they must reach the Principal not later than the 10th, nor earlier than the 1st of May 1923.

Each Essay must bear a motto ; this motto is also to be written on the outside of a sealed envelope inside which is a paper containing the name of the competitor ; the name of the competitor must not appear on the outside of the envelope and must not be written on the Essay. Each Essay must be the *bonafide* unaided work of the competitor submitting it.

C. C. WILSON,
Principal.

The Madras Forest College Magazine.

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